



THE MARINE REVIEW



VOL. 47

CLEVELAND

MAY, 1917

NEW YORK

No. 5

Has Congress Read the War News?

Early Developments at Washington Arouse Doubts of Congress Meeting Crisis Efficiently—Early Blunders of France and England Furnish Lessons—"Short-War" Fallacy

UNCLE SAM must go to school. Our boasts about our low rate of illiteracy, our pride in our educational system, avail us little at this time. When a man well versed in English literature picks up a rifle and dons a uniform, he becomes but a child. When a nation schooled in peace enters a modern war, it must take an intensive course in order to learn how to fight. It is characteristic of a big peace-loving democracy that its conquests are industrial or social, not militaristic. Preparations for war are not a part of the program of free peoples. But when war does come, its unaccustomed lessons must be learned quickly and completely.

No one questions America's ability to fight. But the distinction between being able to fight and knowing how to fight, is a broad one which widens with every advance in military science.

Comments upon the need of training, the necessity of universal co-operation, the importance of co-ordinating our governmental, financial and industrial activities, are relieved from the commonplace that repetition begets, by developments of the first days of war. To the American who has studied the experience of the great European democracies, France and England, and remembers the costly sacrifices caused by their early blunders, these lessons are clear. What excuses may be raised for their "muddling along" policy, cannot be raised in extenuation for similar mistakes we may make now.

What the "Short War" Theories Have Done

The short war fallacy was the parent of many of the mistakes made by our new allies. Politicians avoided, with the nation's approval, the early adoption of measures that would have saved thousands of lives. Kitchener with his prediction of three years of war stood almost alone. Every measure adopted was intended to meet a temporary condition and the loss of Serbia, Montenegro, Poland, Rumania, the defeats at Nueve Chappelle, Loos, in the Champagne and at Gallipoli and Kut-el-Amara were the result.

The war may not last another year; American

troops may never enter the trenches on the western front; American battleships may never fire a hostile shot. But peace will come all the sooner, if America concentrates her immense resources from now on in the assumption that the war will last indefinitely. Germany, conceivably, may again propose peace next winter. The possibility approaches a probability if she has arrayed against her at that time an America with large armies undergoing intensive training with the avowed purpose of appearing in Europe within a few months; an America equipped with transports to handle these troops and their attendant supplies quickly and continuously; an America in which the government, business men, laborers, every resource, financial and physical, is waging a whole-hearted campaign with but one common inspiration—to win the war, no matter how long it may be and what sacrifices it entails.

A Clear Program is Needed

England and France had to learn their lessons from the very beginning. We are fortunately able to draw upon their experiences for guidance in avoiding proved mistakes. To increase output, England depended first upon private initiative, then upon reluctant government aid and finally upon practically complete state control. A clear outline from Washington of what is needed, a clear understanding upon the part of the people, including both the business man and the worker, of these needs will avoid the necessity of the two latter steps. Private initiative, if given a wise program to which the country can rally, will surmount any emergency.

Germany added one hundred million new enemies not because *furor Teutonicus* blinded her to their might, but because she doubted whether that might would be used effectively. Government, labor and business must show her how fatal that mistake is. The country has received satisfactory assurances from the last two. It expects, and if necessary will exact, similar results from its congressmen and the heads of departments.

Enlists Wooden Ships to Win War

Shipping Board Believes This Country Must Build Sixty-Five 3,000-Ton Wooden Vessels Monthly to Convince Germany of Hopelessness of Submarine Campaign

WILLIAM DENMAN, San Francisco, chairman of the United States shipping board, is convinced that one imperative necessity in winning the war is to convince the German government that our forests and machine shops can turn out merchant tonnage faster than the submarines can sink it. Investigations of the board, he states, convinced the members that American ship yards could turn out wooden vessels of 3,000 tons at the rate of 200,000 tons a month, beginning Oct. 1, without interfering with the construction of steel ships now under way.

We can have 800 to 1,000 of these ships in 14 months' time, says Mr. Denman, and their speed would be from 10 to 12 knots per hour. If we can accomplish this, he adds, we can write off any sum that such an enterprise would cost

and feel that it had been spent with profit. As a measure of educating the Middle West to the necessity of shipping under the American flag, he says, it is proposed to take the men from the semi-military colleges in the west, put them on the vessels as gunners, and teach them to love the sea.

This standardization plan is one of the two chief measures the shipping board is putting forward to prepare for war. The other is the passage of the amendment to the shipping bill, which was held up by the senate filibuster and which will be taken up at the present extra session of congress. This amendment provides for the commandeering of ships owned by American corporations of which foreigners own all the stock. There are ships of 750,000 total tonnage which might be commandeered under the provisions of the bill, Mr. Denman says.

A STILL greater problem, however, was to build many more ships, and the first difficulty that arose was the inability to get steel workers away from more needful tasks, including naval construction.

"The supply of skilled steel workers is limited," Mr. Denman said recently, "and when it became apparent that the building of merchant ships would be delayed on that account, the board started work on its plan of standardizing wooden construction. We have been at work since late in February on the plan. There are wooden vessels on the Pacific coast constructed to carry 3,600 tons deadweight. The parts of such ships will be standardized so as to allow them to be cut at various mills in the timber regions, either on the Pacific coast, the south, or the New England coast. These parts, cut at many mills, will be sent to yards at different points, where they may be assembled.

Getting Ship Carpenters

"With the growth of steel ship construction the supply of ship carpenters has been growing smaller constantly, and that is one of the difficulties which we face in the construction of wooden ships. We have planned, however, to get the services of house carpenters, with a skilled ship's carpenter over every seven or eight of them. These ships may be turned out at the rate of one every four months at first, and at a much greater rate when the plan is put into full operation.

"The navy will take for merchant carriers a very large tonnage of ships now in ordinary commerce for the purpose of carrying coal, naval supplies and as a reserve against losses of such supply

ships. The public may look for a great disruption of the mercantile carrier force as soon as hostilities commence."

Mr. Denman said that the proposed shipping bill will undoubtedly be passed at the extra session. Under it any ship being built by an American corporation of which foreigners own all the stock must either be put under the American flag and be subject to commandeering in case of war, or else the corporation building it must tender it for sale to the government.

"As the law now stands," he added, "under many of our yard contracts the ships when launched could sail away without rendering any service to the United States in return for our yard facilities. The disruption of our commerce, due to the loss of the coast to coast fleet, now engaged in carrying supplies abroad, and the consequent disturbance of the flow of food supplies into our larger cities had created a real emergency for many of our poorer citizens, even before the war began.

"Some of the vessels now on the stocks, if brought under our flag, would undoubtedly relieve the condition. When the legislation is enacted, the foreign-owned vessels in our yards, carefully estimated at 750,000 tons, will pursue the private interests of their owners until necessity requires their commandeering."

The shipping board is devoting all its time to preparedness problems, Mr. Denman said. In perfecting the wooden ship plan, he said, one of the objects of the board was to arrange to build ships which would be useful after the war for ordinary commercial purposes.

"Ninety per cent of the assistance which the country can render to the

allies in the war will be of a commercial nature," continued Mr. Denman. "It is in connection with the transportation of supplies to Europe that the United States must organize its energies to help to win the war. For two months the shipping board has been considering effective measures, and we have begun to organize our forces to the end of supplying transportation tonnage for the allies from a source which would not disturb the sources of steel ship building and general steel construction.

"We on the west coast are familiar with the wooden ship which has plied up and down our coasts for many years. In this emergency all we could turn to were the forests, the wood worker, and the smaller boiler factories, and there lies the nucleus of a great fleet of wooden ships.

200,000 Tons a Month

"Under a proper organization, with such a man as Mr. Goethals at the head of it, we could turn out wooden ships at the rate of 200,000 tons a month, without interfering with the steel trade of the country, and within seven or eight months from the time that construction started. These ships would be of about 3,000 tons each, would have a speed of 10 knots an hour in the peaceful sections of the Atlantic ocean, and in the submarine zone could be speeded up to 12 knots. It is possible that we could have 800 or 1,000 such vessels within 14 to 16 months' time.

"Assuming a high rate of destruction on the part of the German submarines, if this fleet could convince the German government that the construction of our steel and wooden ship yards could keep pace with such destruction, they would

begin to feel that their ruthlessness in that particular line was useless. We could supply these boats from Oct. 1 of this year, and they would have a life of 18 to 35 years, and could be made of green wood as rapidly as the timber could be cut.

"The shipping board feels that such a fleet would go far towards convincing the central powers that it is useless to struggle against the forests and machine shops of this country. If we could do this we could write off the \$50,000,000 or more that they would cost and consider that it was spent with real profit.

We feel that the great drawback to all previous attempts at shipping legislation in congress has been the lack of interest and knowledge of the middle west in the ocean. During the last two years great interest from western Pennsylvania to eastern Montana has been stimulated in the shipping problem. We propose to call upon the men of semi-military colleges in that section, bring them to the coast, train them as gunners, and place them aboard this fleet of wooden vessels. If we can do that with 2,000 or more men—bring them down to the sea, and set them afloat—we may be reasonably

sure that they will never forget the importance of the sea.

"Until you have convinced the country that there is a direct connection between our problems on the sea and the man who sows wheat in the middle west, you are not going to have anything but indifference on maritime questions. They don't see that it may be to the interest of the carriers of another nations to divert their shipping and to leave the wheat sower of the middle west high and dry. It is not ships that make overseas commerce, but the men who own the ships."

Wooden-Ship Builders Meet U. S. Board

ANTICIPATING the need of a large fleet of merchant ships, the United States shipping board on March 14 conferred with representatives of ship building yards to find out the extent of their equipment for building small cargo vessels of wood of a uniform design. The conference resulted very satisfactorily and proof was forthcoming that a goodsized fleet could be constructed for the carrying of food and other supplies to Europe. This emergency has become acute since the declaration of war on Germany, and it is anticipated that the United States will be called upon to build such a fleet and to supply her European allies.

In such an emergency the shipping board possesses the power to purchase a merchant fleet. At present the board is authorized to spend \$50,000,000 in this work if it decides it is necessary, but in this emergency, the board may decide to spend about \$200,000,000 for a fleet such as outlined to the shipbuilders.

At the conference were representatives from the following concerns:

Percy & Small, Bath, Me.; G. G. Dear- ing Co., Bath, Me.; Atlantic Coast Co., Thomaston, Me.; Kelly-Spear Co., Bath, Me.; Brewer & Co., Staten Island, N. Y.; Wilmington Iron Works, Wilmington, N. C.; G. S. Baxter & Co., Jacksonville, Fla.; Hillyer-Spearing-Dunn Co., Jacksonville, Fla.; Slidell Shipbuilding Co., Slidell, La.; J. B. Drake & Sons, Bath, Me.; Bruce Dry Dock Co., Staten Island, N. Y.; Naulty & Son, New York; Crowell & Thurlow, Boston, Mass.; Lyon, Gary & Co., Chicago, Ill.; International Shipbuilding & Marine Engineering Co., Detroit, Mich.; Merrill-Stevens Co., Jacksonville, Fla.; Atlantic Gulf & Pacific Co., New York; A. C. Anderson & Co.; Salmen Brick & Lumber Co.; New Orleans, La.; C. Vey Holman, Franklin, Me., and representatives of the department of commerce and the navy department.

Commissioner Brent of the shipping board explained at the opening that the purpose of the meeting was to aid the

board to get first-hand information as to what ships of moderate size could be built, how long it would take to build them and what could be done to increase the facilities for such production.

Questions were asked of various shipbuilders in turn, tending to show what they had built, what they could build and how far their facilities could be expanded.

Undried Wood Suitable

Considerable discussion developed as to the suitability of southern pine timber in different states of drying for ship building. Various builders present testified to the use of the material without such drying, and stated that they were

satisfied that ships built of it were suitable for 15 years' work. At least one testified that he had built ships of this material, but little dried, and had secured a rating for 15 years' service.

Mr. Hitchings, representing A. C. Anderson & Co., of California, explained the use of wooden power-driven vessels on the Pacific coast for carrying lumber and other freight, and told something of the great strides that had recently been made in the production of such vessels.

It was developed that almost all the yards represented could expand somewhat, and, if given assistance, felt competent to produce an increased number of wooden hulls.

At the close of the morning session Frank W. Sprague, chairman of the ship building committee of the naval consulting board, made a very clear statement of the importance of cargo ships in case of war. He emphasized the fact that we must realize that we are facing a possibility of war with the greatest military organization the world has ever known, and that if such war should come, the way in which we could most quickly make our resources of use would be to ship the maximum amount of supplies to Europe in the shortest possible time. For this purpose, considering the submarine danger, he was convinced that a large number of moderate sized vessels with considerable speed and quickness of control would be most useful.

In the afternoon Commissioner Brent at the opening emphasized for the board the fact that the board had no desire to go into ship building to compete with any existing yards and had no intention at the moment of placing any orders, but that it felt it its duty to pave the way carefully for rapid construction of cargo vessels should an emergency require such action.

Mr. Ryan, from the St. Clair river, explained that a year ago he had foreseen the probable necessity for rapid ship construction. He stated that he had been to England to study the question and that he had under option several

Lumber for Vessels

At the request of the shipping board, the Southern Pine Association recently wired the owners of 525 mills included in its membership to prepare to take care of emergency calls for material for ship building and "other work necessitated by the international crisis." The telegrams also were sent to a number of mills outside the association membership. Many replies have been received, all promising co-operation.

Chairman Denman of the United States shipping board recently received a telegram from some interests in the west denying the report that douglas fir is unsuccessful in boat construction. The telegram gave a list of about 30 vessels by name which have been made of this kind of timber. The oldest of these vessels is 38 years old, while the youngest is 10 years old, the average being 18 years, and the ships are still in excellent condition and in active service.

Mr. Denman also pointed out that 48 wooden vessels are now being constructed on the Pacific coast from douglas fir, and every one of these vessels has already been sold to private interests who expect to operate them in the foreign trade of the United States.

yards along the St. Clair river which he believed he had now developed to a point that would enable him to launch eight vessels every four months.

Mr. Sawyer, of the Kelly-Spear Co., Bath, Me., when questioned as to the possibilities of having the frames of ships sawed to pattern in the wood advised that his companies were already doing that, and that he believed the practice could be extended to advantage. Some of those present felt that this step toward standardization of parts for ship-

ment to assembling points could be carried further to advantage.

In summing up, Mr. Plummer, from Maine, pointed out that there were at least 30 existing ship yards in Maine now in operation which would average at least two ships per yard, and that if a force of men familiar with woodworking could be provided from other sources of the country to expand existing forces of laborers, he felt that he would be conservative in stating that Maine could then easily build at least

50 ships of the largest size at one time.

A ship builder from one of the Gulf states explained that few of the Gulf yards were represented at the meeting and that he was convinced that this section, because of its proximity to timber and iron supplies could be counted on to produce a large number of hulls. He stated that while the vessels now building were mostly smaller than 3,000 tons, deadweight capacity, he was confident that the yards could soon expand to build the largest vessels.

What British Think of Wooden Ships

THE advantages of the United States in building wooden ships are discussed at some length by a special correspondent of *Lloyds List*, who believes that the construction of a large fleet of such vessels will enormously help the allies. The article, which is interesting as viewing the shipping board's proposals from a British standpoint, says, in part:

"The principal work of the American navy, in the event of war, would be the guarding of trade routes, and the overcoming of the German submarine campaign, and that work would resolve itself into an extensive system of convoy for merchant ships, and patrol of routes and coasts. For this work far more light cruisers and destroyers would be required than America now has, as well as the largest possible numbers of those mystery vessels to which inadvertent reference was made in congress recently, and which are understood to be very fast, motor submarine chasers, capable of being carried on board larger ships, and launched quickly whenever necessary.

"This would mean greatly increased activity in American shipyards, and a slackening off in the construction of steel merchant vessels. America would be in the position which Great Britain occupied during the latter half of 1914 and most of 1915, when mercantile ship building was considered of only secondary importance.

No Practical Objection

"In these circumstances, the question has been asked, why not revive on a large scale the construction of wooden ships? As America is scarcely likely to be troubled by the question of man power, there seems to be no practicable objection to such a revival, from the ship building point of view. In normal circumstances there would be economic objection, as the steel cargo steamer has reached such a stage of perfection that nothing can compete with it in ordinary trading. Steel has superseded wood, because it permits of larger vessels being

constructed, but also because, size for size, it is a more efficient and economical material.

"Circumstances might introduce new conditions and compel the United States to consider the question of encouraging its wooden-ship building industry. If this were found feasible the yards where steel ships are built would be relieved of much of the pressure which they would otherwise have to meet, and so would be more at liberty to devote themselves to naval work, and to the construction of those steel vessels which they might have on order or might find it necessary to undertake.

No Other Country Could

"In any such scheme as this the United States would be in a position totally different from that of any other country making a similar attempt. Indeed, no other country could make such an attempt with any hope of success, because no other country has the necessary industrial conditions. Nowhere else are there the materials, ship yards and labor that could be combined so as to produce wooden ships in numbers worth considering seriously.

"The peculiar position of America in this respect renders the new proposals far less a matter for surprise than they would have seemed a year or two ago. They are quite serious proposals, and will almost certainly be carried out if the country does come in.

"Reference has been made to the question of man power. In the aggregate there is such an enormous number of workers in America that no calls for military service would be likely to affect essential industries. But the point meantime is that there are still plenty of men accustomed to the construction of wooden vessels, as well as a large number of well-equipped establishments. Behind all these there are the practically inexhaustible forests of America and Canada, all of which could be drawn upon without utilizing sea-carriage to any extent whatever. In wooden-ship building the country is self-contained.

The industry has survived longer in America than anywhere else, partly because of these favorable conditions, and partly because wooden vessels could be operated economically in the lumber and general coasting trades of the Pacific and Atlantic seaboard. In these trades speed and timetables count for little, but large carrying capacity on low operating cost counts for a great deal, while low first cost counts for even more. In many cases the fact that a wooden vessel can be run up locally in a very short time, and at a low cost, means everything.

"So it comes about that the United States as a country is in a position to introduce a new factor. It can throw wooden-ship building into the balance, without making itself any the weaker in fighting along other lines. This is an 'extra' peculiar to itself, and one which may quite well be of considerable value—especially when the internal combustion motor is remembered. The fact that there is an industry to mobilize is significant, for no such mobilization would be possible in any other country."

Canada to Test Plan

A ship building plant with a capital of \$1,000,000 is in process of organization in St. John, New Brunswick, and its successful completion is practically assured. The company is known as the St. John Ship Building Co. and will operate under a dominion charter. It proposes building at first wooden ships with all sail, or with auxiliary oil-burning engines as power.

The ships will be built on the principle that obtained in the old days when St. John was celebrated for its ship building industry, separate companies being formed for the building of each vessel, the owners to sell or operate the vessels as they may determine, the parent company to build the ships at cost plus 10 per cent and turn them over to the owners at that figure.

Short Range Weather Forecasting

How the Barometer Can Be Used in Connection With Weather Maps for Predicting Storms on the Great Lakes

By Capt. George S. Laing

THIS article is written for Great Lakes navigators and represents an attempt to show how the barometer can be used for wind prognostication in conjunction with the current United States and Canadian hydrographic bulletins. These daily sheets are full of meteorological information and it is only right that inland seamen who can obtain them should be interested in their interpretation.

Meteorology is an unexplored and inexhaustible branch of science, which treats of the atmosphere enveloping our globe. The seaman's problem is to be able through visual and instrumental means to forecast the coming and going of storms.

Air and wind are synonymous and their fickle movements have exploded more than one theory. For that reason alone the study of the barometer in relation to the safety of ships and their crews is pregnant with priceless compensation. The mercury barometer records the weight or pressure of the air and the thermometer measures its temperature. Aneroid barometers fulfill the same function as those of the mercury type and are better known to Great Lakes seamen. They are of metallic construction, depending on a metal chamber nearly devoid of air as their means of recording atmospheric pressures. By means of springs that answer to the indenting of the sensitive chamber lid, the clock-like hands are given a rising or falling motion over an arc of a graduated circle reading in inches and fractional parts exactly as in the mercury barometer. Instead of a vernier the more simplified tell-tale hand is used on the aneroid to note the increase or decrease of pressure.

Laws Govern the Winds

To forecast the weather simply by reading a vessel's barometer is not within the pale of man's ingenuity, but any ship captain who uses his barometer intelligently in collaboration with weather bureau reports can fortify himself with very valuable deductions.

Now the laws that govern wind motions in the northern hemisphere must be taken into account. As our main topic is storms, comment on fair weather phenomena will be side-tracked as much as possible. For the

Great Lakes, winds can be boiled down to anti-cyclonic and cyclonic. The first named occur in air regions, where the barometer reads high, and, generally speaking, these high pressure areas, marked on the weather maps "High", are associated with fine to moderate winds and calms.

The second class of winds, the cyclonic, are the product of low pres-

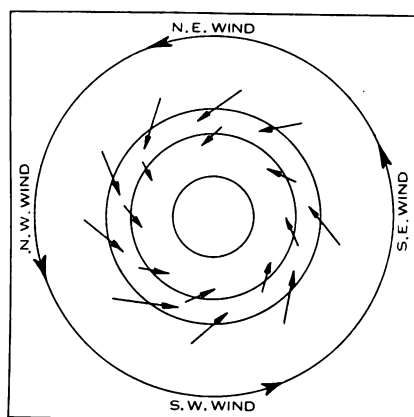


FIG. 1—DIAGRAM ILLUSTRATING THE CYCLONE THEORY OF STORMS

sure areas, marked "Low" on the weather maps. They are associated with storms. They produce winds of a dangerous velocity; in other words, gales that raise heavy seas.

In the Track of Low Pressure Areas

On North American waters cyclonic winds revolve against the hands of a watch or left-handed, and the whole storm area or field has a more or less circular formation. It has also certain winds that belong to particular quadrants of the circle. This approximation gives southwest gales on the equatorial edge of the storm field and northeast gales on the polar arc of the cycle. See Fig. 1 for a diagram illustrating this theory. As the storm area moves as a whole, it will be understood how it is that the gales within it shift in direction over the ship or harbor affected.

While the Great Lakes are not, as a rule, in the path of tropical cyclones, they are in the unenviable position of having to put up with the low pressure areas, which travel across our continent towards the Atlantic ocean.

Looking at the accompanying illustrations, you will note how the "High"

areas of pressure have high readings in the center, such as 30.6 inches, barometer, which decrease as the field widens. In the "Low" areas it is just the reverse, with readings as low as 29.4 inches in center, and increasing or rising towards the outer curves of the field.

The direction in which the whole storm moves is known as the line of progression or advance and for the Great Lakes it can be said that the storm fields or "Low" areas are, generally speaking, bound east. Energetic "Lows" from the Atlantic seaboard have an effect on the Great Lakes winds, but do not come up country. They, however, retard or recurve our own continental storm areas.

When it is admitted that conjecture still plays a large part in observatory forecasting, it would almost appear useless for Great Lakes navigators to attempt to read Nature's signs. At the same time, the harder the problem, the more necessary it is to study it, and the following procedure will be found to give a fair understanding concerning the possible and probable shifting of storm areas, thus forewarning the fortunate sailors of the Great Lakes who have the use of the weather bureau's charts.

Isobars are circles or curves of equal barometric pressures. Arrows show direction of wind and its velocity is marked by short strokes on the arrow feather. Explanatory data are given, of course, on the government charts.

Locating the Storm Center

To find the area of low pressure in any storm field, the observer in the Great Lakes district faces the wind and allows 12 points, or 135 degrees, to the right. This bearing, by compass, of the storm's center is all important, as then the ultimate change of the wind in direction and the behavior of the barometer tells us which quadrant of the storm area or field the ship or harbor is in. Again, should the barometer continue to fall, but the gale keep blowing from the same point, then the ship or harbor is really in the path of the center. If the barometer rises with a gale steady, the storm's vortex or center has passed you, and comparative safety can be expected, although high velocity winds are very frequently met with

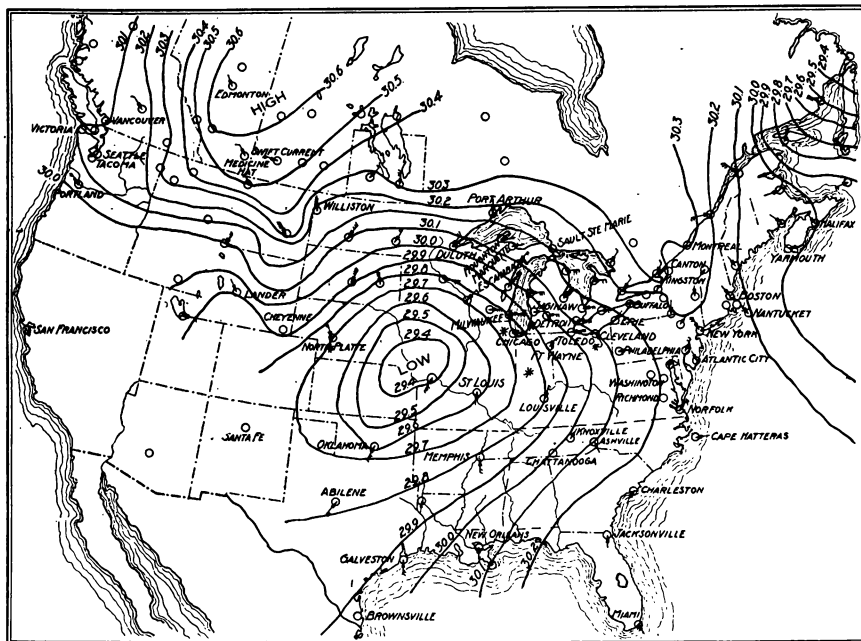


FIG. 2—WEATHER MAP FOR JAN. 21, 1917, 8:00 A. M.

between the "Low" and an adjacent "High".

Let it be noted here that in different parts of the world the behavior of cyclonic areas is in accordance with local conditions. Therefore, it happens that the center of Great Lakes' storm areas are not so dangerous as the centers of typical tropical-born cyclones with their pyramidal seas and temporary lull in winds. The cyclonic storms of these latitudes, then, have peculiarities all their own. For instance, their rapid movement as a whole would make tropical cyclonic areas appear sluggish, yet these latter hold within their circuitous fangs, gales of extreme velocity that are seldom heard of on the Great Lakes. November, 1913, was an exception, as that storm showed the ferocity of the tropical-born wind fiend.

Storm Center Travels

How to tell when to remain in shelter, or when to make for it, as well as when to leave port in comparative safety, can only be worked out by the dual study of the barometer and the weather charts, and the procedure should be something like this.

Find the storm's center by allowing at the beginning of the gale 12 points to the right of the first direction. This 12-point rule draws in almost to a right angle as you near the vortex of the storm area. With the bearing of the center and the direction of your initial wind you can tell approximately which quadrant you are in, as the storm fields are constructed similar to the diagram shown in Fig. 1.

Make a rough diagram of each storm, marking down the changes in barometer readings and concise rec-

ords of the shifting of the gale. If the wind shifts to the right (when you are facing it) then the path of the center is on your left hand and vice versa.

The three charts shown herewith are taken from mid-January of this year and portray a low pressure area or storm field especially suitable for illustration to lake sailors. In Fig. 2 the storm we will deal with has its center about 400 miles to the southwest of Chicago at 8 a. m. of the day in question.

In Fig. 3 we find that the whole area has moved in a northeastern direction and at 8 p. m. of the same day the low pressure center is over Grand Haven on the east coast of Lake Michigan, thus in 12 hours the

storm center has traveled a distance of 500 miles. In Fig. 4, or at 8 a. m. the next morning, the same storm has its center between Ottawa and Montreal, having swept all the lakes.

To digress again may be permissible in such a complex subject. As atmospheric pressures change with the height of the observer above sea level, it is at once apparent that the Great Lakes' barometers will never coincide with the meteorological data that is conjointly supplied from hundreds of shore stations and laid down on the weather maps of the United States and Canada as corrected readings. We must therefore hinge our procedure in forecasting more to the changes, that is, the rising or falling of barometers on board ship than to their actual readings.

Determining Tomorrow's Weather

It has already been shown how a seaman on the lake can find the center of an oncoming storm area. Also by noting the rise or fall of the barometer in conjunction with the wind's changes in direction, we have pointed out how to tell which part of the low pressure area you are in. But with a captain who is loading at Duluth or Fort William, his trouble is how to judge next day's weather from the bulletin sheet in his hand for the current day, as his vessel is on the eve of departure.

He must see mentally to the following items:

Are there any low pressure areas in the lake vicinity?

Are any likely to menace Lake Superior before the Soo can be reached?

How is the barometer acting?

Are its diurnal variations normal, or has it dropped down into the fore-

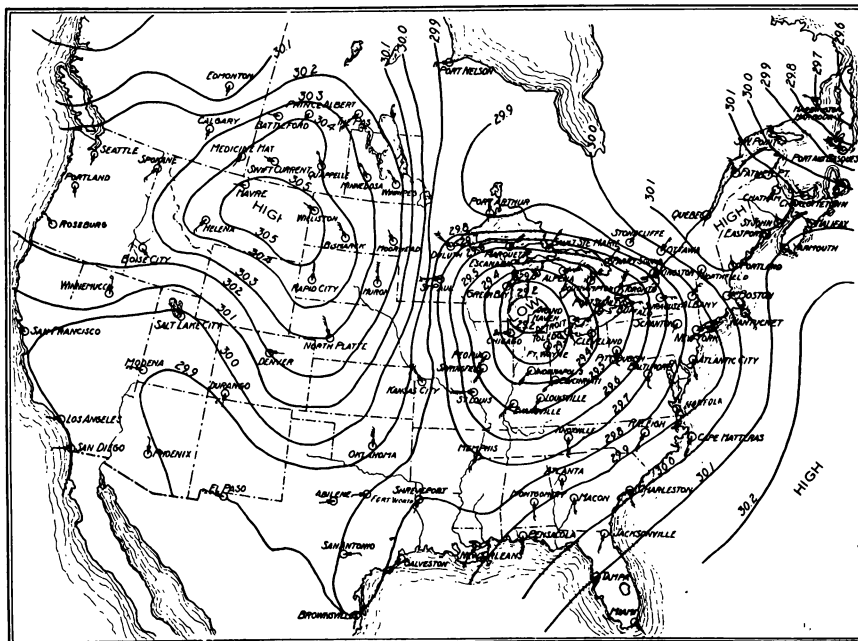


FIG. 3—WEATHER MAP FOR JAN. 21, 1917, 8:00 P. M.

peak, with an angry look in the heavens?

How is the wind acting in harbor?

Deductions from our three weather maps will be profitable at this point. Take the hardest case first. Assume you have no weather sheet, and that you poke your head into the binnacle hood at Duluth and find that the wind is blowing from the northeast. Where is the center of that storm? Allowing 12 points to the right (seeing the gale has just started) the storm vortex or center will bear about south. Should the barometer keep falling and the wind backing to north, then you must be to the left of the storm center and roughly on the Pacific arc of the circle. Also, the whole area must be moving to the east-northeast, which is the line of progression or advance. If this be so, then the storm center will hit about Chicago. Now if you try the chart, Fig. 2, as a guide, this deduction will be seen to be about right.

In Fig. 3, which gives Cleveland a south gale, let us figure out mentally where the storm center is. Now Cleveland is well covered by the area so we must only allow nine or 10 points to the right, which will bring the bearing of the center to about west by north or west-northwest. If wind veered to the west and barometer kept falling, the shift being to the right (from south to west) then Cleveland would be to the right of the center and on the equatorial part of the storm field. And that is where Cleveland is shown in Fig. 4. In other words, the Indianapolis part of the storm came up to Cleveland, while the center was hiking for Lake Ontario, through Port Huron and Toronto. In Fig. 4, the "Low" has actually gotten in between Ottawa and Montreal, and has an Atlantic "Low" on its right.

A Game of Chess

An examination of each weather bureau map is similar to a game of chess and nothing but a study of these valuable sheets can make lake navigators weather-wise. The key to the solution is actually put into our hands by these maps and when the captains begin to interpret them for themselves, the results will prove most advantageous. Gales that develop where no weather sheet is available can be worked out by the law of storms that has been explained.

To ship masters who would like to compare their barometer readings with standard instruments on shore and get the sea level corrections, the equation for each lake can be had from the weather offices or may be found in some manual on marine

meteorology. As the barometer falls 0.1-inch for every hundred feet in altitude, the corrections roughly will run about from 0.3-inch on Lake Ontario to 0.6-inch on Lake Superior. This will be a plus correction to lake barometers. The result will then compare approximately with the weather map readings.

It should be emphatically stated that every captain and officer on the Great Lakes should study the weather and barometer business from a good book. In trying to offer a practical solution on this little known subject of forecasting for seamen, the writer has not even attempted to mention the hundred and one branches

keep your weather eye on the barometer. When ashore in the winter months attend any lectures given by the government meteorologists on wind subjects.

No class of navigators in the world have more need to try and forecast the weather than those on Great Lakes, as they have so little sea room in which to maneuver, that human skill is all but completely baffled and their vessels sometimes are literally blown ashore like flotsam on a lee beach.

The New York state nautical school-ship NEWPORT was taken to the navy yard Wednesday, March 14, for neces-

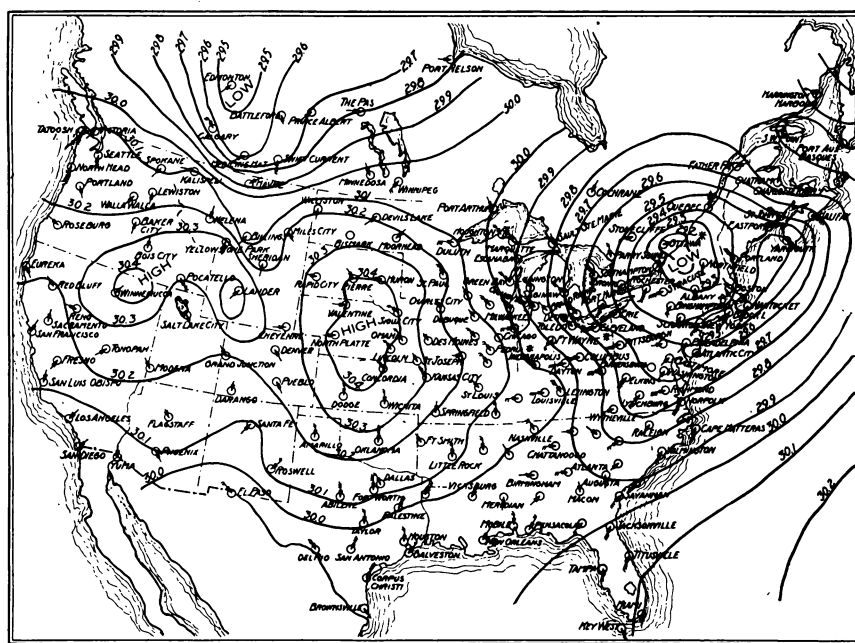


FIG. 4—WEATHER MAP FOR JAN. 22, 1917, 8:00 A. M.

of fundamental study that underlie the problem, simply because the theoretical side has no right to be uppermost in this article.

November bears out its reputation as being the most stormy month of the year on the Great Lakes. The northwest "Low" or storm fields supply the Great Lakes with most of their gales. The Atlantic "Low" or storm fields from our eastern seaboard seldom reach the Great Lakes with dangerous winds. When a "Low" has passed over the lakes going east and an Atlantic "Low" is off the coast, heavy baffling gales often obtain over the inland waters.

As regards weather forecasting by the visual examination of clouds, etc., the results differ so much with locality and environment with respect to mountain ranges and other surface obstructions that one almost might as well pretend to read the weather from the ash of a cigar. Get interested in the daily weather maps and

sary repairs preparatory to her usual summer cruise as well as for replacing her tail shaft and propeller wheel which were lost last summer within two days' sail of Horta, Azores.

New 10,000-Ton Boats

The two 10,000-ton steamers building for the Osaka Shosen Kaisha are nearing completion in the yards of the Mitsubishi company at Nagasaki, Japan. The liners may be christened VICTORIA MARU and VANCOUVER MARU, and they are to be added to the company's service between Tacoma and the Orient. It is expected that the first of the new liners will be launched in October and the second will be ready for launching a few weeks later. They will be sister ships and will carry approximately 10,000 tons of freight.

The new steamers are of the same type as MANILA MARU, and will have accommodations for 12 first cabin and 200 steerage passengers. They will have a speed of 12 to 14 knots.

New Cunard Agent

Charles P. Sumner, who for many years past has successfully managed the business of the Cunard line in New York, resigned recently. The unremitting strain of the last few years has placed a heavy tax on Mr. Sumner's health and strength, and he did not feel justified in undertaking the reorganization of the company's American business, which now includes the Commonwealth & Dominion lines to Australia and New Zealand, in addition to the Cunard and Anchor lines to Europe. The consolidation of these lines was made in preparation for the new conditions which will exist after the war.

Mr. Sumner has had a long and distinguished career in the maritime world. A native of Boston, he first entered the shipping business in New York in 1870, when he opened a branch for George Warren & Co., ship owners and merchants. Upon Mr. Warren's death, Mr. Sumner succeeded to the business and established the firm of Charles P. Sumner & Co. This business he continued, representing Rankin & Gilmore, Edward Bates & Sons, and a number of prom-



T. ASHLEY SPARKS

inent English ship owners, until he joined the Cunard company as its Boston representative. He was founder and owner of the Sumner line of steamers between New York and Liverpool, which was the first line

of importance exclusively devoted to the transportation of freight and livestock between those two ports. The boats which composed it are now engaged in trading in the far east.

Mr. Sumner will be succeeded by T. Ashley Sparks, a partner in the firm of Funch, Edye & Co., present agents of the Commonwealth & Dominion line in New York. Mr. Sparks will join the board of directors of the Cunard company. At the same time arrangements are being made for the incorporation of the firm of Funch, Edye & Co., and for the acquisition by the Cunard company of an interest in the business, which will, however, continue to be managed entirely by the partners, who now constitute the firm.

Mr. Sparks was born in London in 1877. He came to the United States in 1897 to join Shewan, Tomes & Co., of Hong Kong, and was agent in New York for them during the period from 1900 to 1907.

He formed and managed from 1903 to 1907, the American-Asiatic Steamship Co., running a freight service between New York and the far east. In 1907, he joined the firm of Funch, Edye & Co., as a partner.

Start Work on Powerful Naval Units

THE five battle cruisers which have been awarded will be the first vessels of this type in the American navy. They are officially known as Nos. 1 to 5, inclusive. They will be the largest and fastest vessels of this type ever laid down for any navy. The main characteristics are: Displacement, 34,800 tons; speed, 35 knots; length, 850 feet beam, 91 feet; armament, ten 14-inch guns, eight torpedo tubes, eighteen 5-inch guns, four 3-inch anti-aircraft guns and other guns of lesser caliber. Their high-power machinery installations are protected by armor consistent with the design. A new feature of these vessels, never before incorporated in any ship of a powerful military type, will be their complete equipment for carrying, launching and operating the largest size hydroplane. The limit of cost for these vessels is \$16,500,000.

The four battleships for which contracts were recently awarded will be known as COLORADO, MARYLAND, WASHINGTON and WEST VIRGINIA. They will be slightly larger than their predecessors, TENNESSEE and CALIFORNIA. Their chief characteristics are: Displacement, 32,600 tons; speed, 21 knots; battery, eight 16-inch guns, twenty-two 5-inch guns, four 3-inch anti-aircraft guns; complement, 1,022. They will have the same

large cruising radius which characterizes all recent United States battleships. Their armor protection and underwater protection against torpedo attack will be unusually complete.

The 44 torpedo boat destroyers, also

Why Submarine Losses Are Hidden

The wisdom of the British government in suppressing information regarding the number of enemy submarines destroyed is generally admitted by shipping men. The purpose of this policy, as outlined by a representative of a leading British line in this country, is temporarily to make unnecessary the protection of considerable expanses of water.

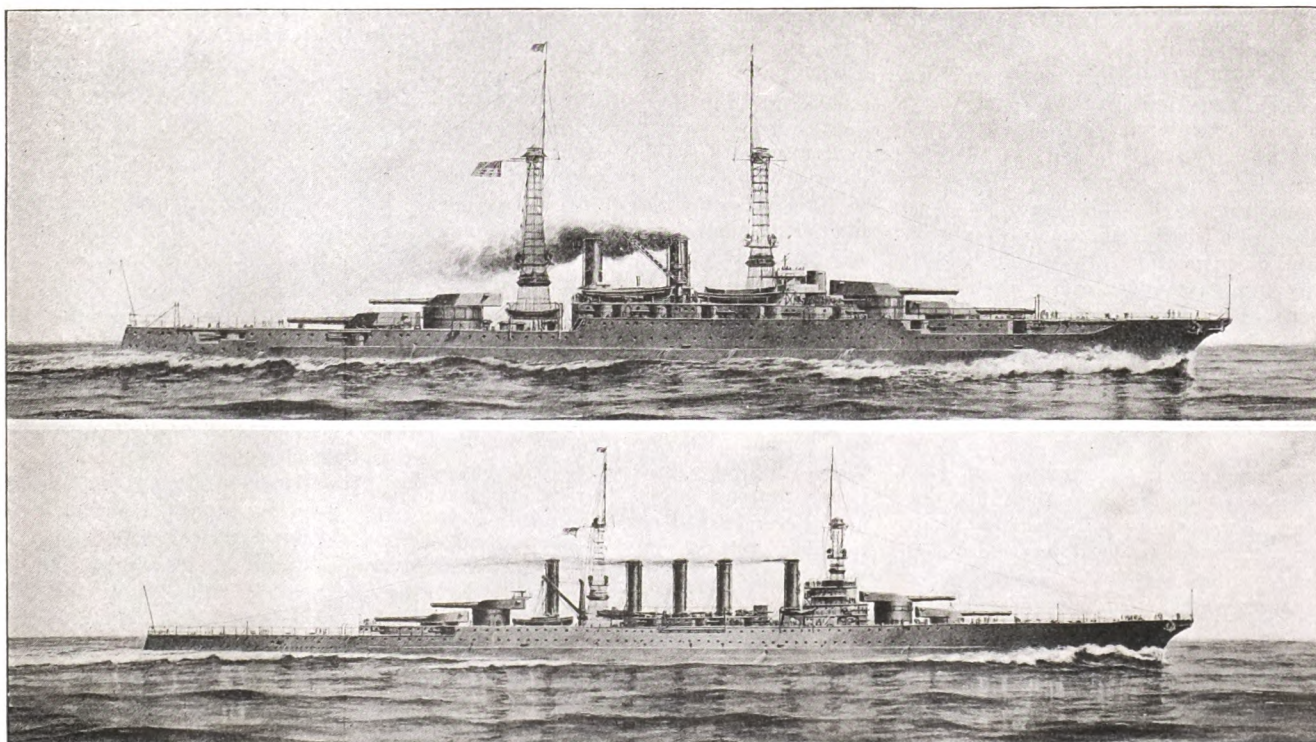
"The German submarines are sent out to patrol certain 'beats,'" said this authority. "The British destroyers discover and sink it. If this fact is published another U-boat is sent out by Germany to take its place, but otherwise the Germans do not learn of the loss until another submarine is sent out to relieve the one destroyed or until the time when it would have returned to its base. Similarly, the names of ships sunk are not made public now so that U-boats sent out to sink a particular vessel may lie in wait for it even after it has been destroyed."

contracted for recently, are known as Nos. 75 to 118. Like their predecessors, they will carry a very heavy battery and will have an unusually large cruising radius for vessels of their class. They represent a small increase in displacement over the last vessels laid down, but will be capable of an increased speed of about five knots. Their chief characteristics will be: Displacement, 1,185 tons; speed, 35 knots; battery, four 4-inch guns; four triple torpedo tubes; two anti-aircraft guns; complement, 95. These vessels will attain their rated speed on their full design displacement and not on a very much lesser displacement which can only be attained by stripping the vessels of many essential features, as is done by a number of foreign boats of this class for which very high speeds are claimed.

In addition to the vessels described above, as well as those listed in the table on the facing page, the navy department has awarded contracts for about 200 small submarine chasers, is building 64 in government navy yards and is buying others. Bids were taken April 11 for 38 800-ton submarines. In about two months, bids will be opened for three 42,000-ton battleships, completing the present naval program.

Important Naval Vessels Contracted for in Past Few Months

Name and Official Number	Tonnage	By Whom or Where Building	Cost	Date of award	Time of delivery
Battleships—					
Maryland	31,200	Newport News S. B. & D. D. Co.	\$11,235,000	Dec. 5, 1916	39 months
West Virginia	31,200	Newport News S. B. & D. D. Co.	11,235,000	Dec. 5, 1916	45 months
Colorado	31,200	New York Ship Building Co.	11,450,000	Nov. 29, 1916	39 months
Washington	31,200	New York Ship Building Co.	11,450,000	Nov. 29, 1916	45 months
Battle Cruisers—					
Number 1	34,800	Newport News S. B. & D. D. Co.	Cost plus 10 % profit	Mar. 15, 1917	No date set
Number 2	34,800	Newport News S. B. & D. D. Co.	10 % profit	Mar. 15, 1917	No date set
Number 3	34,800	New York Ship Building Co.	10 % profit	Mar. 15, 1917	No date set
Number 4	34,800	Fore River Ship Bldg Corp.	10 % profit	Mar. 15, 1917	No date set
Number 5	34,800	Philadelphia Navy Yard.	Not announced	April, 1917	No date set
Scout Cruisers—					
Number 4	7,100	Seattle Construction & D. D. Co.	\$4,975,000	Dec. 26, 1916	30 months
Number 5	7,100	Seattle Construction & D. D. Co.	5,975,000	Mar. 15, 1917	30 months
Number 6	7,100	Seattle Construction & D. D. Co.	6,000,000	Mar. 15, 1917	31 months
Number 7	7,100	Wm. Cramp & Sons S. B. & E. B. Co.	5,950,000	Mar. 15, 1917	30 months
Number 8	7,100	Wm. Cramp & Sons S. B. & E. B. Co.	5,950,000	Mar. 15, 1917	30 months
Number 9	7,100	Union Iron Works	6,000,000	Mar. 15, 1917	No date set
Number 10	7,100	Union Iron Works	6,000,000	Mar. 15, 1917	No date set
Destroyers—					
Numbers 75-78, Inc.	1,185	Bath Iron Works	Each 1,150,000	Nov. 30, 1916	22 to 25 months
Numbers 79-86, Inc.	1,185	Fore River Ship Bldg Corp.	Each 1,160,000	Dec. 26, 1916	1st, 24 months others 30
Numbers 87-92, Inc.	1,185	Union Iron Works	87 to 90, each 1,190,000 91 and 92 1,185,000	Nov. 16, 1916	22 to 26 months No date set
Numbers 93-94, Inc.	1,185	Mare Island Navy Yard	Not given	Nov. 16, 1916	No date set
Numbers 95-104, Inc.	1,185	Union Iron Works	Cost plus 10 % profit	Mar. 24, 1917	No date set
Numbers 105-112 ...	1,185	Fore River Ship Bldg Corp.	10 % profit	Mar. 24, 1917	No date set
Numbers 113-118 ...	1,185	Wm. Cramp & Sons S. B. & E. B. Co.	10 % profit	Mar. 24, 1917	No date set
Submarines—					
Numbers 78-95, Inc.	Not given	Electric Boat Co.	78 to 86 692,000 87 to 95 697,000	Nov. 23, 1916	24 to 33 months
Numbers 96-101, Inc.	Not given	Lake Torpedo Boat Co.	96 to 97 697,000 98 to 101 699,000	Nov. 23, 1916	24 to 33 months
Numbers 102-104, Inc.	Not given	California S. B. Co.	699,000	Dec. 1, 1916	25 to 27 months
Number 105	800	Electric Boat Co.	1,189,000	Nov. 23, 1916	29 months, 15 days
Number 106	800	Lake Torpedo Boat Co.	1,199,000	Dec. 1, 1916	29 months
Number 107	800	Navy Yard, Portsmouth, N. H.	Limit of cost 1,200,000	Nov. 14, 1916	No date set
Hospital Ship—					
Number 1	9,800	Navy Yard, Philadelphia.	2,315,879	Aug. 29, 1916	Probably April 1, 1919
Gunboat—					
Number 21	1,575	Navy Yard, Charleston, S. C.	860,000	Aug. 29, 1916	No date set
Ammunition Ship—					
Number 1	10,600	Navy Yard, Puget Sound.	Limit 2,350,000	Jan. 5, 1917	No date set
Fuel Ship—					
Number 16	14,500	Navy Yard, Boston	1,523,334	Aug. 29, 1916	No date set



BELOW—THESE BATTLE CRUISERS ARE DESIGNED TO BE THE FASTEST AND MOST POWERFUL EVER BUILT;
ABOVE—COLORADO CLASS BATTLESHIP

What the Government is Doing

Rulings on Marine Matters

Improvements to Waterways

Hints to Navigators

Revised Ruling on Passenger Allowance

THE supervising inspector general of the steamboat inspection service in a recent circular, addressed to inspectors of the service and steamboat companies, quoted an act of congress of Feb. 14, 1917.

The act authorizes supervising inspectors to decrease number of passengers allowed by local inspectors to be carried on passenger vessels, except ferry boats, and requires the approval of supervising inspector before number of passengers allowed on such vessels can be increased. Penalties are provided for master or owner of any vessel who knowingly allows to be carried a greater number of passengers than is stated in certificate of inspection. Before any passenger vessel is allowed to engage in excursions it must be provided with a special permit to carry excursion party, issued by local inspectors and approved by the supervising inspector of the district.

The act reads as follows:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section forty-four hundred and sixty-four of the Revised Statutes of the United States be, and is hereby, amended so as to read as follows:

"Section 4464.—The board of local inspectors shall state in every certificate of inspection granted to vessels carrying passengers, other than ferry boats, the number of passengers of each class that any such vessel has accommodation for and can carry with prudence and safety. They shall report their action to the supervising inspector of the district, who may at any time order the number of such passengers decreased, giving his reasons therefor in writing, and thereupon the board of local inspectors shall change the certificate of inspection of such vessel to conform with the decision of the supervising inspector. Whenever the allowance of passengers shall be increased by any board of local inspectors such increase shall be reported to the supervising inspector of the district, together with the reasons therefor, and such increase shall

not become effective until the same has been approved in writing by the supervising inspector."

Section 2.—That section forty-four hundred and sixty-five of the Revised Statutes of the United States be, and is hereby, amended so as to read as follows:

"Section 4465.—It shall not be lawful to take on board of any vessel a greater number of passengers than is stated in the certificate of inspection, and for every violation of this provision the master or owner shall be liable to any person suing for the same to forfeit the amount of passage money and \$10 for each passenger beyond the number allowed.

"The master or owner of the vessel, or either or any of them, who shall knowingly violate this provision shall be liable to a fine of not more than \$100 or imprisonment of not more than thirty days, or both."

Section 3.—That section forty-four hundred and sixty-six of the Revised Statutes of the United States be, and is hereby, amended so as to read as follows:

"Section 4466.—If any passenger vessel engages in excursions, the board of local inspectors shall issue to such vessel a special permit, in writing, for the occasion, in which shall be stated the additional number of passengers that may be carried and the number and kind of life-saving appliances that shall be provided for the safety of such additional passengers; and they shall also, in their discretion, limit the route and distance for such excursions: *Provided, however,* That the issuance of such special permit shall be reported by the board of local inspectors to the supervising inspector of the district, and such special permit shall not be effective until approved by the said supervising inspector."

Needs Draftsmen

In common with private ship builders, the navy department is confronted with a tremendous shortage of ship draftsmen. It is pointed out in a recent communication issued by the United States

civil service commission, that although millions of dollars are available for new construction already begun, work at government yards is seriously handicapped by the shortage of skilled designers and draftsmen. Government officials feel the matter is so important that they are pointing out that service at the drafting board in navy yards is fully as essential at this time as enlistment in the active fighting contingents of the nation. Examinations for positions as ship draftsmen are being held constantly by the civil service commission. The positions open cover four grades of service, ranging in pay from \$3.28 to over \$6.00 per day. Applicants are rated on the following subjects on a scale of 100: Physical ability, 10; education, training, experience and technical ability, 90.

March Lake Levels

The United States Lake Survey reports the stages of the Great Lakes for the month of March, 1917, as follows:

Lakes.	Ft. above mean sea level.	
	Feb.	March.
Superior	602.42	602.33
Michigan-Huron	580.49	580.46
St. Clair	574.87	574.79
Erie	571.35	571.53
Ontario	245.08	245.17

Lake Superior is 0.09 foot lower than last month, 0.18 foot higher than a year ago, 0.76 foot above the average stage of March of the last 10 years, 0.05 foot above the high stage of March, 1901, and 1.67 feet above the low stage of March, 1911. During the last 10 years the March level has averaged 0.2 foot lower than the February level.

Lakes Michigan-Huron are 0.03 foot lower than last month, 1.02 feet higher than a year ago, 0.55 foot above the average stage of March of the last 10 years, 2.49 feet below the high stage of March, 1886, and 1.35 feet above the low stage of March, 1896. During the last 10 years the March level has averaged about the same as the February level and 0.2 foot below the April level.

Lake Erie is 0.18 foot higher than

last month, 0.34 foot lower than a year ago, 0.26 foot below the average stage of March of the last 10 years, 2.32 feet below the high stage of March, 1887, and 0.70 foot above the low stage of March, 1896. During the last 10 years the March level has averaged 0.1 foot higher than the February level and 0.6 foot lower than the April level.

Lake Ontario is 0.09 foot higher than last month, 0.29 foot lower than a year ago, 0.68 foot below the average stage of March of the last 10 years, 2.64 feet below the high stage

of March, 1886, and 0.87 foot above the low stage of March, 1897. During the last 10 years, the March level has averaged 0.2 foot higher than the February level and 0.5 foot lower than the April level.

Mark Detroit River Rocks

In December, 1916, the steamer Wm. F. WHITE, owned by the Limestone Transportation Co., after stranding at a point 2,000 feet northeast by north of the Detroit river lighthouse, and a little to eastward outside the deep vessel

channel entering the mouth of the river, was lightered by dumping overboard a part of her cargo of crushed limestone. At the time this stone was dumped its top was practically awash, but it is probable that it has since been leveled down by running ice.

The vessel company expects to remove this stone at the earliest time practicable this spring, and pending such removal will mark the same by an upright stake with cross arm attached, from which will be displayed a red light and a white light, respectively, on either end.

Many Lines Now Use Panama Canal

THE LINES which have established regular or approximately regular services through the Panama canal since the resumption of traffic a year ago, according to the Panama Canal Record, include:

From the Atlantic Terminus to South and Central America—The Pacific Steam Navigation Co. has services from Cristobal to west coast ports as far south as Valparaiso and Coronel and as far north as San Jose de Guatemala, calling at the principal way ports. Sailings for the Central American ports to the north are monthly. Sailings for Tumaço and Ecuadorian ports, as far as Guayaquil, are every two weeks; sailings to Valparaiso via Chilean and Peruvian ports are fortnightly; and a service between Cristobal and Buenaventura and Tumaco has a sailing every three weeks.

The South American Steamship Co. (Chilean line) maintains practically a weekly service between Cristobal and nearly all west coast ports as far south as Talcahuano.

The Peruvian Steamship & Dock Co., Callao, (Peruvian line) maintains a service between Cristobal and Ecuadorian and Peruvian ports, going as far south as Mollendo and making its principal calls on the way at Guayaquil, Paita, Eten, Pacasmayo, Salaverry, Callao, and southern ports. The line has sailings each way once a week. Its ships arrive at and leave Cristobal every Monday.

The Colombian Maritime Steamship Co., Ltd., operates a vessel in regular service between Cristobal and Buenaventura, making about two round voyages a month.

All of the lines named above carry both passengers and cargo.

From the Atlantic Terminus to Central and North America—The Pacific Mail Steamship Co. is operating a line between Cristobal and San Francisco, with a sailing each way about every 10 days. Calls are made at ports of Central America and Mexico on the way, and passengers are carried.

The steamship IZABAL, operated by the

Empresa de Transportes Maritimos, makes a round voyage between Cristobal and Puntarenas, Costa Rica, with cargo only, about every three weeks.

Between the Atlantic Coast of the United States and the West Coast of Central America—The New York & Cuba Mail Steamship Co. (Ward line) operates a freight and passenger service through the canal between New York and west coast ports of Central America and Salina Cruz, Mexico. The ships discharge and load cargo at Cristobal. Sailings are every three weeks in each direction. JALISCO and MEXICO carry cargo and passengers; MANZANILLO cargo only.

From the Atlantic Coast of the United States to the Pacific Coast of South America—This is the route of heaviest traffic. Many of the vessels plying over it are in the nitrate trade and used exclusively by charterers; the following commercial lines maintain fairly regular services:

The Merchants' line, operated by W. R. Grace & Co., plies between New York and ports of Ecuador, Peru and Chile, with a sailing each way about every two weeks.

The United States Steel Products Co. operates the New York and South America line between New York and the west coast, as far south as Valparaiso, with a sailing each way about every third week.

The West Coast line (Wessels, Duval & Co.) plies between New York and Chile and Peru, with a vessel going each way about every third week.

The three lines named in this section carry cargo only.

From Europe to the Pacific coast of South America—The East Asiatic Co. has a line from Copenhagen, by way of Gothenburg and Christiania, to Valparaiso and intermediate ports, operating on a fortnightly schedule. Passengers are carried.

The Johnson line plies between Swedish and other Scandinavian ports and the west coast, as far as Valparaiso,

with a sailing each way about every 60 days. Passengers are carried on the vessels of this line.

The Booth line has a number of vessels in service between Great Britain and the west coast of South America; sailings have not been regular, and the ships are regular Brazil traders, tramping during the war on account of interrupted trade in their usual area. They are cargo ships.

The vessels of the Nautilus Steam Shipping Co. (the old Gulf line) sailing from Great Britain to the west coast of South America via the strait of Magellan, and returning up the coast, make the home voyage through the canal. The service has cargo steamers, monthly.

The Royal Dutch West India Mail Steamship Co. has approximately a monthly service from Rotterdam to the west coast of South America and return. The ships handle cargo only.

The Pacific Steam Navigation Co. has a vessel frequently direct from Great Britain to Peru and Chile; but the principal service of this company is rendered through its lines from Cristobal to the west coast, connecting at Cristobal with the lines of the Royal Mail Steam Packet Co. and other Atlantic carriers. The same arrangement governs homeward shipments from the west coast, the vessels which go all the way to Great Britain being a minor part of the service.

The transfer service at the Atlantic terminus of the canal, referred to in the first section of this article, cares for the greater part of European shipments through the canal to the west coast of South America.

From Europe to the West Coast of North America—The East Asiatic Co. has a service between Scandinavian ports and San Francisco, operating a vessel each way about every fourth week. The ships carry passengers.

The Johnson line has a service over this route, primarily between Sweden and San Francisco, with a vessel each

way about every 60 days, with passengers.

The Harrison-Direct line has a service between Great Britain and the west coast as far as Puget sound, with a vessel each way approximately every sixth week. These are cargo ships.

The Maple Leaf line plies from New York to Vancouver, to return to Europe by way of California ports and Santa Rosalia. Ships of this line are scheduled to sail every five weeks. They do not carry passengers.

From the Atlantic Coast of the United States to Japan, Siberia, China and the Philippine Islands—The movements of vessels over this trade route have not

rection; and ships operated by Norton, Lilly & Co., sail at irregular intervals, approximately once a month.

The Luckenbach line is operating in this area, sending a ship out from New York about once in three weeks.

It may be noted here that the East Asiatic Co. sends an occasional vessel to the Far East direct through the canal; and at irregular times the vessels of the company return from the Far East to Denmark through the Panama canal.

The Atlantic-Gulf-Far East line has sent a ship through the canal, outward bound from the United States to Japan, and will continue the service according

service between New York and Batavia, Surabaya, and Samarang.

The Luckenbach line is operating a service to Australia and New Zealand, with irregular sailings.

The Federal Steam Navigation Co. has established a line between New Zealand and New York, with a ship each way approximately every six weeks.

The American-Australia line operates between New York and Australia, with a vessel each way about every 60 days.

The Commonwealth and Dominion line serves these trade areas, with a ship about every fourth week.

The Ellerman lines have a service from New York to Australia and New Zealand, with irregular sailings.

From Europe to Australia and New Zealand—The New Zealand Shipping Co. operates a line between New Zealand and Great Britain with possible way calls at Norfolk and New York. Sailings each way are every 28 days for mail boats, with intermediate sailings of cargo ships.

The Federal Steam Navigation Co. operates over the same route, with a ship each way about once a month.

The Shaw, Savill & Albion Co., Ltd., London, has been sending some of its ships through the canal on the homeward voyage from New Zealand. The service is irregular. The outward bound ships have been going around the Cape of Good Hope and none has been sent through the canal to date. This is a cargo service.

The Swedish East Asiatic Co. has an irregular service between Scandinavian ports and the Far East.

At the present time there is no regular service in the United States coastwise trade, between the Atlantic and Pacific ports of the United States. During the fiscal year 1915 this was the heaviest traffic through the canal, being nearly 40 per cent of the total. The interruption of traffic through the canal by the slides for six months, beginning in the middle of September, 1915, caused the diversion of most of the vessels formerly in the coastwise trade to the foreign trade. Since the reopening of the canal the coastwise trade has been relatively slight, and there is no line which at this time operates a service approaching regularity. The Pacific Mail picks up at Cristobal a considerable quantity of cargo for San Diego, Los Angeles, and San Francisco.

Postmaster General Burleson has issued an advertisement inviting proposals for steamboat mail service in New York bay and harbor. After July 1 next only those steamers which reach quarantine between the hours of 6 p. m. and 4 a. m. will be met by boats of the postoffice department. At present the boats are met throughout the 24 hours.

Traffic Through Panama Canal Since Opening

Month and year:	Atlantic to Pacific.			Pacific to Atlantic.			—Total—		
	Ves-	tonnage.	Cargo,	Ves-	tonnage.	Cargo,	Ves-	tonnage.	Cargo,
	sels.	Gross.	tons.	sels.	Gross.	tons.	sels.	Gross.	tons.
1914:									
Aug.	13	58,233	49,106	11	62,049	62,178	24	120,282	111,284
Sep.	27	151,878	141,762	30	151,568	180,276	57	303,446	322,038
Oct.	44	240,925	168,069	40	220,179	253,288	84	461,104	421,357
Nov.	54	247,479	206,510	38	205,071	242,291	92	452,550	448,801
Dec.	43	204,776	179,235	57	280,896	271,219	100	485,672	450,454
Total ...	181	903,291	744,682	176	919,763	1,009,252	357	1,823,054	1,753,934
1915:									
Jan.	44	239,486	208,082	54	251,085	240,925	98	490,571	449,007
Feb.	38	209,822	150,987	53	245,522	276,078	91	455,344	427,065
Mar.	57	269,901	217,447	80	405,380	417,610	137	675,281	635,057
Apr.	59	279,139	237,384	60	290,738	285,457	119	569,877	522,841
May	67	343,701	246,534	75	360,104	332,174	142	703,805	578,708
June	83	412,525	320,619	60	286,330	282,561	143	698,855	603,180
July	93	465,726	316,773	77	356,145	388,696	170	821,871	705,469
Aug.	89	416,463	249,119	72	353,298	326,218	161	769,761	575,337
Sep.	49	235,397	181,380	51	254,064	274,937	100	489,461	456,317
Oct. ....	..	..	..	..	..	..	..	..	..
Nov. ....	..	..	..	..	..	..	..	..	..
Dec.	3	1,548	671	6	12,446	12,908	9	13,994	13,579
Total ...	582	2,873,708	2,128,996	588	2,815,112	2,837,564	1,170	5,688,820	4,966,560
1916:									
Jan. ....	..	..	..	2	814	559	2	814	550
Feb.	4	694	1,100	1	2,685	..	5	3,379	1,100
Mar.	2	387	..	5	18,407	7,000	7	18,794	7,000
Apr.	32	142,642	144,133	48	197,193	224,620	80	339,835	368,753
May	69	311,881	248,289	60	257,157	245,861	129	569,038	494,150
June	70	338,108	292,771	54	231,474	225,020	124	569,582	517,791
July	76	369,678	296,094	73	319,339	352,863	149	689,017	648,957
Aug.	77	372,042	246,149	65	295,032	270,672	142	667,074	516,821
Sep.	69	316,815	224,661	85	412,175	437,509	154	728,990	662,170
Oct.	74	317,826	231,016	84	377,457	416,877	158	695,283	647,893
Nov.	72	314,179	198,718	76	303,517	320,325	148	617,696	519,043
Dec.	82	362,154	241,987	73	313,005	305,696	155	675,159	547,683
Total ...	627	2,846,406	2,124,918	626	2,728,255	2,806,993	1,253	5,574,661	4,931,911
1917:									
Jan.	78	368,253	246,139	98	406,554	425,254	176	774,807	671,393
Feb.	68	324,918	244,307	72	361,947	313,462	140	686,865	557,769
Total ...	146	693,171	490,446	170	768,501	738,716	316	1,461,672	1,229,162
Gr'd total	1,536	7,316,576	5,489,042	1,560	7,231,631	7,392,525	3,096	14,548,207	12,881,567

been regular, as most of the ships load and clear as cargo offers and do not attempt a fixed schedule. The tendency to this practice is fostered by the length of the voyage and a general uncertainty as to the return voyage, with what cargo and by what route.

The principal lines operating in this service are the American and Oriental line, the Barber line, Shewan Tomes & Co., and Alfred Holt Co., sending out a vessel, among them, about once every 10 days from New York; the American and Manchurian line (Ellerman and Bucknall), about once in three weeks; the Nippon Yusen Kabushiki Kaisha, approximately semi-monthly in each di-

rection; and ships operated by Norton, Lilly & Co., sail at irregular intervals, approximately once a month.

The Prince line uses the canal for its service between the Far East and Boston and New York. Some of the ships have sailed to or from Vladivostok, others from Japan, others from Australia. The sailings are irregular, and passengers are not carried.

From the Atlantic Coast of the United States to Australia and New Zealand—The United States and Australia line operates between New York and the ports of New Zealand and Australia, with a vessel out about every month.

The Stoomvarts Maatschappij Nederland, the Rotterdamsche Lloyd, and the Holland-American line co-operate in a

The Economic Aspect of Pure Water

A Summary of the Cost to Ship Owners of Diseases Resulting From Polluted Water Supplies—Description of R. U. V. Purifier

By Albert Tate Smith

THE problem of obtaining pure drinking water on vessels navigating inland fresh water lakes and rivers is a serious one. Many honestly believe, for example, that vessels sailing on our Great Lakes obtain pure water, especially in certain areas limited by sanitary surveys, yet evidence to the contrary has been obtained by bacteriological tests of tap water from these vessels, which showed B. Coli (the indicator of pollution) present in the majority of samples and further, the absence of pollution and its indicator, when corrective measures were taken to purify such water.

The results of drinking polluted water are sickness and death. Both are recorded directly as a result of the consumption of lake water. Hospital records from only a few cities bordering on the Great Lakes show an average of about 18 typhoid cases per city per year for 14 years, among sailors employed on steamers; this figure considers only those cases treated in public hospitals; to this number should be added others who remained home or were removed elsewhere.

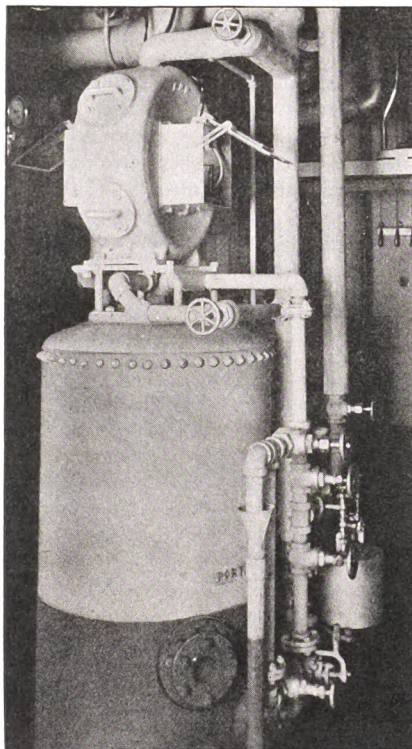
To this average figure must be added, in accordance with Hazen's Theorem (which has been established by statistics) 36 or more additional cases of sickness produced by water-borne disease bacteria, so that in all, there actually existed an average per city of about 54 preventable cases of disease due to pollution in the drinking water used by vessels. Do not forget this is a minimum figure, since sailors treated outside public hospitals are not included, and passengers on these vessels are not taken into consideration at all.

The Financial Side of the Question

Consider another aspect of this matter. There are about 30,250 men employed on fresh water ships in this country. If we assume that they are supplied with impure water, we can expect a total of about 40 typhoid cases per annum as a minimum, with 80 others stricken by other water-borne diseases, and a total death toll of nine lives. This represents in vital capital, allowing only \$3,000 for each life, and commensurate amount for treatment of sickness, a minimum

total of \$63,000 per annum. We believe that all will readily grant that logically this figure should be doubled, to approach actual conditions, so that we can look to a yearly loss of \$120,000 if pure drinking water is not provided.

Consideration of the employment problem presents food for thought, since it has been established that,



ULTRAVIOLET STERILIZER WITH FILTER ON STEAMER ALABAMA

due to sickness, an average of 4 per cent of all employees are incapacitated for a sufficiently long period to necessitate the temporary or permanent employment of others to replace them, and further that death will annually claim an average of 1 per cent of the employees, which result, in this case, in the necessity of employing 5 per cent of 30,250 persons or 1,512 persons yearly.

To advantageously employ and retain 1,512 persons, it will, on the average, be necessary to hire $6\frac{1}{3}$ times that number, or a total of 9,576 persons. Experience has demonstrated that this abnormal gross number must be sifted through the sieve of efficiency and capability to

obtain the desired resultant net amount.

Breaking in a new employe entails the expenditure of real money, varying according to conservative estimates, from \$50 to \$200 each. Averaging this cost for the shipping industry at \$75 per capita, we develop a gross expenditure of \$718,000 per year.

Returning to the matter of vital capital wasted, \$120,000 per annum, due to sickness and death, and adding thereto \$718,000, a gross total of \$838,000 is obtained, from which deductions should properly be made for death and sickness not due to water-borne diseases. Subtracting one-half of \$718,000 to allow for this contingency, we arrive at a fair, yearly expenditure of \$479,000, representing actual preventable waste of money due to impure drinking water.

Checking the Figures

To insure correctness of these facts, this unnecessary wastage of \$479,000 per year can be checked by attacking the problem from the standpoint of the sickness of the working man as follows:

The employe delivering 100 per cent labor throughout the year entails no loss to his employer or to himself. Considering sickness only, however, the average employe loses nine days per year. This, on established average figures, totals a daily loss of \$2.50 for wages and \$1 for medical attendance for the employe, and \$5 for the employer, a total of \$8.50 per day or \$76.50 per man per year.

Considering 30,250 men, the total wastage is \$2,314,125 per annum due to sickness. Of this 25 per cent is established as being preventable, so that \$578,531 are unnecessarily wasted each year, by employers and employes combined, of which \$340,312 is the share of the employers. To re-employ workmen or to employ substitutes to maintain a working force of 30,250 men, involves an expenditure covering the items of hiring, instruction and wear and tear, amounting to an average of \$14.50 per man, leaving other items to be covered by the \$5 previously mentioned as the employer's loss. If this \$14.50 is extended against only the necessary 1,512 employes who must annually

be hired, considering the difference between them and the total of 9,576 persons or 8,064 employes that are hired and eventually discarded, at the reduced per capita figure of \$10, we obtain a total of \$102,564, which added to \$340,312, gives the grand total of \$442,876 as the preventable waste on the part of the employers of these 30,250 men. This checking of cause and effect is indeed close, but actually in the long run they may prove to be identical. This money capitalized at 6 per cent per annum represents \$7,983,000 that intentionally or non-intentionally, must be set aside to pay for preventable errors in business management.

What Purifying Apparatus Costs

To provide 30,250 men with pure drinking water throughout the year, will involve an expenditure of about \$180,000 for purifying equipment, which, when properly selected, will produce the required amount of water for \$21,000 annually, including operating charges, interest and depreciation at 11 per cent. Capitalizing this sum at 6 per cent we get \$350,000, which, subtracted from the \$7,983,000 previously mentioned shows a saving in tied-up capital of \$7,633,000. Furthermore, if we subtract this yearly maintenance figure from \$479,000, a minimum net operating saving of \$458,000 per annum is obtained and this is real money saved that is now being uselessly checked out of treasuries for absolutely no return in either temporary or permanent benefit.

Therefore, one can estimate his individual yearly gain in providing water purifying apparatus by multiplying the number of employes by \$458,000 divided by 30,250, or by \$15.14. One also can estimate the resulting release of capital by multiplying the number of employes by \$7,633,000 divided by 30,250, or by \$252.33.

Turning to the legal side of the question of employes and water-borne diseases, there is apparent the fact that such diseases are being classified by states as preventable accidents, and that decisions are being handed down by state supreme courts favoring the employe. The case of the Dells Lumber Co., Madison, Wis., is an example. Such procedure removes, to a considerable extent, our decision and action from realms of good business to that of virtual necessity, but this necessity carries with it the attractive result of genuine fiscal gain in installing preventative measures.

Business competition and Yankee ingenuity have devised various means of providing pure water. Some are fair, a few are good, and very few are excellent. To meet the U. S.

government requirements, the apparatus must deliver at all times water of specified purity, the apparatus must be automatic in action, proof against carelessness, indifference and forgetfulness, and dependable in every stress of weather.

The R. U. V. Co., 50 Broad street, New York, has studied the requirements of the government thoroughly and for some time this company has manufactured apparatus designed to meet the specifications in all respects. Beside accomplishing all that the government requires, the ultra violet ray sterilizer is designed to offer consistent maintenance and operating performance. The equipment consists primarily of a filter and a sterilizer. The filter is used to properly clarify the water. It consists of a thick cylindrical steel shell, capable of working under normal operating pressures. The shell is filled with graded sand of selected quality which superimposes the straining system in the bottom of the filter. This system is fitted with non-corroding metal strainers attached to pipe manifolds that are connected to the outlet connection in the bottom of the filter. The control valves are conveniently located outside the shell.

During the filtering operation, water is admitted at the top, passes down through the sand which extracts the suspended matter, is collected by the straining system and leaves through the outlet connection. During the washing operation this procedure is reversed—then the water enters through the straining system, rushes upward through the sand, agitates and cleanses it, leaves at the top and discharges to waste.

An alum pot, which is provided as a shunt on the raw water line, proportionally feeds alum in small amounts to the water. The alum reacts to form the well-known "floc" which assists the sand in extraction and retention of the suspended matter. This dissolved alum does not pass through the filter.

Function of the Sterilizer

The sterilizer is furnished to kill the bacteria in the water. It is proportioned to operate on normal pressures. It also is designed so it may be cleaned without disconnecting piping or wiring, and to be capable of proper operation by engine room attendants as well as accurate and foolproof in functioning.

It consists of a closed casing, fitted with a removable cage containing a quartz tube, around which the water is repeatedly caused to flow by a system of interior baffles. Inside the tube is placed an ultra violet ray

lamp, which projects its light into the water and instantly kills the bacteria. This lamp is operated from available electric current.

A solenoid operated valve is inserted in the pipe line adjacent to the sterilizer, which prevents the flow of water through this system, excepting when the ultra violet ray lamp is illuminated, and at proper intensity of illumination to afford bacteria killing power. A pressure regulator is also inserted in this pipe line to assure flow of water not in excess of the guaranteed capacity of the system.

Tests have indicated that 1 cent per 1,000 gallons covers the operating charges of the ultra violet ray system under normal conditions. It also is pointed out that this system eliminates extra pumping, since it operates under pressure and may, therefore, be inserted in existing water distribution systems.

The author of this article has endeavored to show that it pays ship owners to provide pure water for drinking purposes on board their vessels, and pays them well, but it must be seriously realized that money spent for preventative measures will be uselessly and improperly spent unless the desired results are produced.

North and South Traffic

The total number of ships which had passed through the Panama canal to the end of the calendar year 1916, from the beginning of traffic on Aug. 15, 1914, was evenly divided between south and northbound traffic. The number moving each way was 1,390, making a total of 2,780.

The net tonnage moving from the Atlantic, however, exceeded that from the Pacific by 1.68 per cent (4,643,113 compared with 4,566,390); while on the other hand, the cargo from the Pacific exceeded that from the Atlantic by 33.11 per cent (6,653,809 tons compared with 4,998,596). The shipments from the Pacific are made up mostly of raw products, such as nitrates, grain, ores, sugar, copper, etc., which are loaded more heavily than the shipments of manufactured goods coming from the Atlantic.

Japan Sells Ships

During 1916 numerous Japanese vessels were sold to foreigners at large profits, while some foreign vessels also were bought. The *Japan Chronicle* states that according to the latest investigations made by the department of communications, newly built Japanese vessels sold abroad in 1916 numbered nine, with an aggregate tonnage of 33,190, while old ships

sold numbered 11, aggregating 41,087 tons, or a total of 20 ships and of 74,277 tons. The vessels bought from abroad numbered 8, aggregating 34,877 tons, so that the vessels sold exceed those bought by 12 in number, and by 39,400 tons.

This is the first time in history, says the *Chronicle*, that Japan has appeared in the market as a seller of ships, though it has been a large buyer for many years. The following table shows vessels bought and sold during the last five years:

Years	Bought.		Sold.	
	Num-ber	Gross tons	Num-ber	Gross tons
1912.....	26	83,466	..	.....
1913.....	60	204,060	1	1,351
1914.....	28	96,752	..	.....
1915.....	13	37,654	2	6,245
1916.....	8	34,877	20	74,277

Panama Machine Shop

In order to expedite repairs on the equipment of the coal handling machinery at the Cristobal coaling station, Panama canal, a machine shop is being erected at the east end of the plant near the office of the superintendent. The building contains a machine shop proper, a blacksmith shop, and a room for an air compressor plant and for the storage of heavy repair parts, all housed together. The building has outside plan dimension of 36 x 94 feet and is one story in height. The blacksmith shop is in a room at the north end, 16 x 36 feet; the air compressor section is 40 x 36 feet, and the machine shop is at the south end. Equipment

for the machine shop includes a radial drill, 20 and 36-inch lathes, a shaper, and work benches at the corners of the room.

As a part of the policy of making repairs at the plant, avoiding the drafting and delays necessary in sending work to the shops, employment of the coaling plant operators is confined to skilled mechanics.

When an unloader tower, for instance, is not in operation the force on it can work at overhauling and maintaining it in the best of condition, or can go into the machine shop to work at repairs when called upon. Heavy repairs will continue to go to the large shops of the mechanical division.

How to Build Up Our Merchant Marine

By George J. Baldwin

A PERMANENT revival of the American merchant marine requires the modification of existing laws, specialized education, a broader investing interest and the support of the government, says George J. Baldwin, president of the Pacific Mail Steamship Co., in a recent issue of *The Americas*. Mr. Baldwin points out briefly the factors which gave this country its early supremacy on the sea and the transfer of power to Great Britain. Of the latter he says:

"England's rapidly developing industries in coal and iron enabled her to produce a cheaper cargo carrier than could be built in this country and from that time until this her supremacy in the ocean trade of the world has been undisputed. This supremacy has permitted the construction of vessels in such large volume that individual ship builders have been able to specialize and to construct in large numbers a single type of vessel, bringing their costs lower than those of other nations.

"We have had one opportunity of specializing in ships," Mr. Baldwin continues. "The traffic on the Great Lakes, protected by law, required that Americans should construct American ships to transport coal, ore and wheat, and because of this protected condition we have been able to produce upon the lakes cargo carriers moving freight at less cost per ton mile than any other agency anywhere else in the world.

"No country produces steel, coal, copper and all of the various raw products entering into the manufacture of vessels more cheaply than we do. Our machine shops and technical industries have grown tremendously, our skill today in the manufacture of machine tools and other labor saving machines surpasses

that of any other nation, and our inventive capacity ranks equally high. We are generously equipped, ready to begin our struggle for our place upon the ocean. The volume of our foreign trade, already immense, is growing, and will continue to do so. It is imperative that we find means of transporting our goods in our own vessels, and not in vessels owned and operated by our competitors.

"What better course can we pursue than to devote some of our new capital to the construction of merchant ships, so that we may again carry over 90 per cent of our foreign trade in American bottoms? We shall be prepared for any contingency which may befall us, when to this merchant fleet we have added an armed navy capable of protecting it.

Awaken the Middle West

"The people along our coasts have been more or less awake to this need, but those of the interior have only just begun to think of it. Now, however, the acute scarcity of ocean tonnage and the high costs of ocean transportation consequent upon it have been brought home to everyone, and I believe public opinion is awakening.

"England is now engaged in nationalizing her entire shipping for the purpose of using it, not for competition between British subjects, but as a unified instrument directed by one central authority and operated for the benefit of the nation. Can we compete with this unless we are permitted to follow along lines of concentration instead of unlimited competition between ourselves? Japan is taking possession of the trade of the Pacific ocean. She subsidizes her ship builders and her shipping companies, and is today in control of the bulk

of the traffic on the Pacific. Norway has been concentrating the enormous profits earned by her vessels, and a large proportion of the merchant shipping now under construction in American yards is being built with this money for her benefit.

"The cost of ship construction today in the United States is no higher than in competing maritime nations, but this is an abnormal condition of which we must take present advantage, and during this period we must learn to construct our ships as cheaply as those of England, Germany, Scandinavia and Japan. To this end our colleges should co-operate. Beginning with the training of our young men during their undergraduate courses, we must co-ordinate this theoretical education with practical work in our ship yards, so that on graduation our naval architects and marine engineers will be thoroughly qualified for their part in this work. Our ship building corporations must co-operate with the schools and with each other in order that all yards may be able to reduce their cost of construction. To realize the greatest advantage to the nation, our laws should be so modified as to permit the most economical operation of the ships we construct. Our bankers should teach the people the necessity and wisdom of investment in our merchant marine, and finally, the power of the United States government should be added to our other agencies in order to encourage in the fullest possible manner the growth of our ocean transportation system, so vital to the needs of this country. If we do these things, our future is assured, but if we fail in one of them, we shall lose our opportunity perhaps never again to secure it."

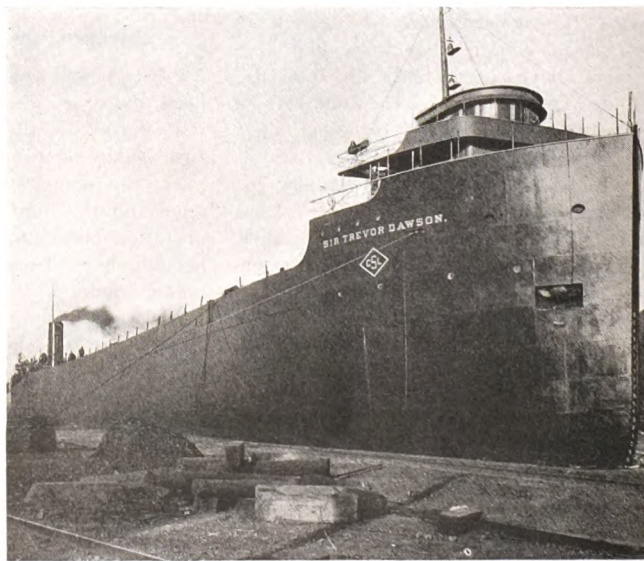
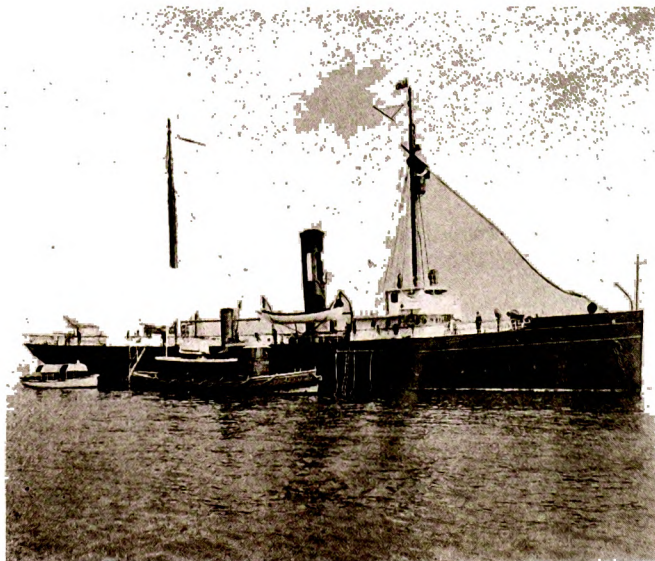
Latest Marine News in Pictures

Payment Will Be Made For Acceptable Photographs



UNLEASHED DOGS OF WAR—HARD HITTING FIGHTERS OF THE FLEET

Two of Uncle Sam's most powerful fighters, TEXAS and NEW YORK, lying off the Statue of Liberty, New York bay. Since war was declared on April 6, the whereabouts of these grim warriors has been carefully guarded by navy officials, but it is generally known that the first line ships are near our eastern coast, ready for any contingency.

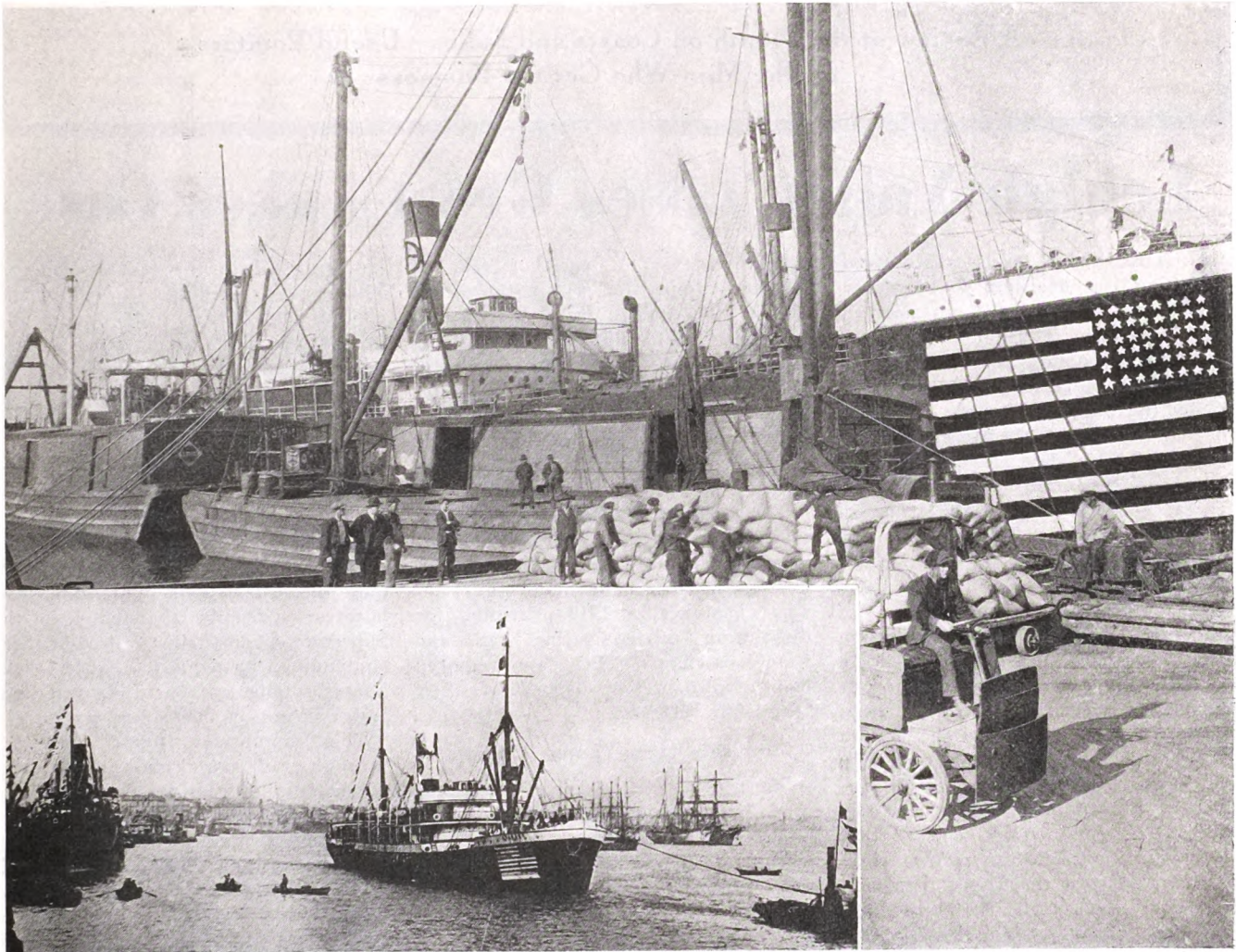


STRIKINGLY DIFFERENT TYPES OF CRAFT—UNITED STATES DERELICT DESTROYER AND A LAKE FREIGHTER

Above are shown the United States cruising cutter SENECA and the Canadian Steamship Lines' bulk freighter SIR TREVOR DAWSON, formerly W. C. MORELAND. Since the declaration of war the cruising cutters, which are armed with small caliber guns, are under orders from the navy department and are detailed for coast guard patrol. A well-placed 3-inch shell means certain destruction to a prowling submarine.

Photographs From Far and Near

Contributions For These Pages Are Solicited



AMERICA'S ANSWER TO GERMANY'S CHALLENGE

Immediately after Germany's announcement of unrestricted submarine warfare, Orleans loaded in the port of New York. She carried food and supplies to the allies. In the accompanying illustration, Orleans is shown entering Bordeaux, the first American vessel to sail through the barred zone in defiance of the Kaiser's mandate.



THE PORT OF A THOUSAND TONGUES

The Bush terminal, New York City, will play an important part in the war between United States and Germany. Bustling activity has marked this terminal ever since the allies began to draw upon this country's food and manufacturing reserves. Now it is planned to increase still further this outpouring of essential supplies.

In the Traffic Manager's Office

A Review of the Month on Coasts and Lakes—Useful Pointers
for the Men Who Get the Business

Lehigh Valley Loses Great Lakes Case

A DECISION practically affirming the decision of the interstate commerce commission in the matter of the right of railroads to own and operate boat lines on the Great Lakes, was handed down March 26, by the Supreme Court. This was in connection with the petition of the Lehigh Valley line. The Supreme Court affirmed the decision of the federal court for the eastern district of Pennsylvania. That court dismissed the bill filed by the Lehigh Valley Railroad Co. against the interstate commerce commission. The bill sought to enjoin the commission from enforcing its order requiring the railroads to relinquish the ownership of its boats on the Great Lakes.

The commission ordered the Lehigh Valley, as well as other railroads, under the Panama canal act, to dispose of its holdings in boats on the lakes. The commission declared that the ownership tended to restrict competition between the trunk lines and the boat lines and the ownership was therefore unlawful. The Lehigh Valley carried the case to court as the boat line owned by the Lehigh Valley was but a continuation of its rail transportation, the rail lines all being east of the lake ports. The commission held that the rail line, however, was a competitor of the boat lines inasmuch as it was a party to trunk line freight tariffs.

Since this decision was rendered the interstate commerce commission has recommended a modification of the law, which would give the commission more discretion in divorcing rail and water lines. In its report to congress the commission pointed out that in some instances a continuation of the rail ownership, even though competition is restricted, tends to improve the transportation service to the public. In support of this the commission cited the case of the ownership of boat lines by the New York, New Haven & Hartford railroad.

In its decision, handed down recently, the Supreme Court said:

"We assume that the question whether the facts found by the com-

mission present a case of real or possible competition within the meaning of the statute is a question of law that could not be conclusively answered by the commission; but still there is nothing for a court of equity to enjoin if all that the commission has done is to decline to extend the time during which the boat line may be operated without risk."

The Lehigh Valley was the first railroad to appeal to the Supreme Court from interstate commerce commission orders, made under the Panama canal act of 1912 providing for dissolution of competing rail and water carriers. This law required many railroads to dispose of their steamship interests.

Steamship Line Long Operated

Since 1881 the Lehigh Valley railroad has operated steamers on the Great Lakes, between Buffalo, the western terminus of its railroad line, and Chicago and Milwaukee. Its steamers were operated through the Lehigh Valley Transportation Co., a New Jersey corporation owned by the railroad.

The railroad, the interstate commerce commission held, competed for traffic with its steamship line. That the steamships were supplementary extensions, or "feeders", of its rail facilities was contended by the railroad, which insisted its rail lines do not and cannot compete for western traffic with the steamships.

After passage of the act the Lehigh Valley and other railroads petitioned the commission to retain their steamship lines. On May 7, 1915, the commission denied the petitions, including those of the Lehigh Valley, Pennsylvania, New York Central, Rutland, Erie, Grand Trunk, Lackawanna and others. The order required the Lehigh Valley and the others to dispose of their steamship interests. The act provided a penalty of \$5,000 a day for not obeying the commission's orders, but provided the roads might retain the steamships if the commission certified that such ownership was a necessity or a convenience to the public.

The Lehigh Valley brought an in-

junction suit in the federal court at Philadelphia seeking to enjoin the commission's order. The court dismissed the suit, but granted a temporary injunction for continuing the railroad's operation of its lake line, pending final determination by the Supreme Court.

The railroad attacked as unconstitutional that clause of the Panama canal act conferring discretion upon the interstate commerce commission to permit railroads to retain shipping interests. This contention was, however, virtually abandoned in the Supreme Court, the railroad there contending, principally, that its lake line is supplementary to its rail lines and did not compete for traffic.

The commission found that the through rail rates and joint traffic agreements between the Lehigh Valley and western railroads operate to make the Lehigh Valley rail and vessel lines competitors. The railroad pleaded that shippers were free to choose transportation by rail or water. The government contended that was evidence to prove that the case was exactly what the law was intended to reach and characterized the lake line as a "bludgeon in the hands of the railroad to suppress independent lake competition." That congress never intended the canal act to apply to rail and water lines which are non-competitive was argued by the railroad.

The case was heard in the Supreme Court in March, 1917.

The Grand Trunk railway will be permitted to retain possession and continue the operation of its boat lines on the Great Lakes, however, under a decision handed down by the interstate commerce commission three days before the Lehigh Valley decision. The commission held that the lines are being operated in the interest of the public and to the advantage and convenience of commerce, and that an extension of their operation by the railway "will neither exclude, prevent nor reduce competition on the route by water under consideration." The lines will be required to file tariffs with the commission like other common carriers.

Scarcity of Lake Ships

The prediction is made in Canada that so far as ships of British registry are concerned the tonnage on the Great Lakes in the season of 1917 will be reduced even below the figures of last year. At the end of 1916 the amount of tonnage of British registry was 218,000, or some 68,000 tons less than in 1915. The only new tonnage placed on the Great Lakes under British registry amounted to 12,000 tons. At present there is only one boat—a 10,000-ton vessel—in Canadian ship yards under construction for lake traffic. Everything else is being built for ocean service. If tonnage on the Great Lakes should be increased by ship owners of the United States this year, the trend of traffic eastward, particularly in grain, may be directed more than ever into American channels.

Canal Companies Merge

The Shippers' Navigation Co., Inc., Syracuse, N. Y., recently purchased the entire assets of the Follette Line, Inc., Buffalo, bringing together two of the leading Erie canal transportation interests. The merger brings under one control a fleet of 42 vessels with an aggregate tonnage capacity of 10,650 tons.

Japanese Profits

The unprecedented boom in the shipping trade in the Pacific last year, which is expected to continue this year, as a result of the prosperous trade between America and Japan, enabled the Osaka Shosen Kaisha, the second largest steamship company in Japan, to obtain the largest profits in its history in the latter half of 1916. The company netted 12,040,000 yen (\$6,001,940) during the six months, according to an announcement from the management, transmitted by Consul General Scidmore at Yokohama. This is larger than the gains of any other steamship company in Japan.

A new epoch in the history of the Osaka Shosen Kaisha was marked by the opening of the Australian and South American lines last fall. Despite opposition from the Nippon Yusen Kaisha, which has been engaged in the Australian trade for many years, the new Australian line of the Osaka Shosen Kaisha has been profitable from the beginning.

With a view to extending its established service and inaugurating a few more new lines, both domestic and foreign, the Osaka Shosen Kaisha, at a general meeting of shareholders in Osaka, unanimously decided to increase its capital to 50,000,000 yen (\$24,925,-

000). This company now has a total reserve fund of 15,840,000 yen (\$7,896,240). It operates 144 vessels, with an aggregate tonnage of 292,000. These are employed on the Tacoma, Australian, South American, San Francisco and Bombay lines, and several domestic lines.

The president of the Osaka Shosen Kaisha, at the meeting, outlined a ship building program of 380,000 tons, costing 105,000,000 yen (\$52,290,000), in the course of five years. Out of the total, 270,000 tons are for the expansion of its fleet and 110,000 tons for the replacement of superannuated ships; 68,000 tons have already been ordered from different ship building yards, and orders for 74,000 tons have also been placed.

The number of ships that it is proposed to build in the course of this year in Japan is 81, with a tonnage of 350,267, out of which 15 vessels, amounting to 56,918 tons, are those for which the proposed launching before the end

Transfer of U. S. Ships

According to a report by the bureau of navigation, department of commerce, between July 1, 1914, and Feb. 28, 1917, ships transferred to the American flag from foreign flags numbered 204 of 664,925 gross tons and ships transferred from the American to foreign flags numbered 405 of 313,811 gross tons. The American flag made a net gain of 351,114 gross tons and a net loss of 201 vessels, or, in other words, American citizens bought much larger vessels than they sold. The bulk of the American gain in tonnage has been from the British and German flags, and the Norwegian, Japanese and French flags have made the largest net gains. The following table shows the foreign flags involved and the number and gross tonnage of vessels transferred from those flags to the American flag and from the American flag to those flags, with the net American increase or decrease:

Flag.	To American.		From American.		American Increase or Decrease.	
	Num-ber.	Gross tons.	Num-ber.	Gross tons.	Num-ber.	Gross tons.
Belgian	6	10,549	..	..	6+	10,549+
British	111	357,669	170	82,651	59-	275,018+
Cuban	6	18,702	37	8,401	31-	10,301+
Danish	5	13,193	5	3,631	..	9,562+
Dutch	6	26,724	3	8,131	3+	18,593+
French	2	6,247	20	26,740	18-	20,493-
German	32	155,941	3	1,603	29+	154,338+
Greek	1	4,471	3	2,119	2-	2,352+
Italian	2	2,769	..	..	2+	2,769+
Japanese	1	5,869	16	38,720	15-	32,851-
Mexican	9	11,652	35	6,707	26-	4,945+
Norwegian	7	15,311	30	91,211	23-	75,900-
Portuguese	..	..	7	3,943	7-	3,943-
Roumanian	1	5,275	..	..	1+	5,275+
Russian	3	2,144	2	986	1+	1,158+
Spanish	..	..	11	11,963	11-	11,963-
Swedish	..	..	2	909	2-	909-
South American countries	10	23,299	22	18,667	12-	4,632+
Central American, Haitian, Dominican, etc.	2	5,110	39	7,429	37-	2,319-
Total	204	664,925	405	313,811	201-	351,114+

of last year had to be postponed on account of the shortage of materials of construction.

Lost in Pacific

All hope has been abandoned for the safety of the Japanese steamship GISHUN MARU, under charter to Frank Waterhouse & Co., which sailed from Vancouver, B. C., Jan. 23 and from Seattle, Jan. 30, for the Orient with a \$2,000,000 cargo for the Russian government. The cargo consisted chiefly of munitions, including heavy shipments of explosives. It is feared that she foundered in one of the great gales that swept the north Pacific in February. Since she reported out at Cape Flattery no sign or trace of the missing Japanese vessel has been reported. GISHUN was a vessel of 3,900 tons, built in Sunderland, Great Britain, in 1898. She was one of the best known freighters of the Waterhouse transpacific fleet, having made a number of voyages to oriental ports.

Old Liner Now Schooner

The one-time handsome Sound liner RHODE ISLAND, of the Providence & Stonington Line, built at Noank, Conn., in 1882, is to be converted into a six-mast schooner. She is now at the yard of the Tietjen & Lang Dry Dock Co., Hoboken, having her hull repaired and strengthened. When this work is completed, she will be taken to Noank, where she will be converted by the United States Ship Building Co. for the Continental Trading Co., New York. RHODE ISLAND will return to service under her new rig from the same yard that first created her, the United States Ship Building Co. having purchased the ship building yard of Robert Palmer & Son, the company which originally built the vessel. She will go into commission under the name of DOVREFJELD.

Joseph J. Cuneo, 40 years old, ship owner and banana importer, died March 16 at his home in Jersey City.

Late Decisions in Maritime Law

Legal Tips For Ship Owners and Officers

Specially Compiled for The Marine Review

By Harry Bowne Skillman

Attorney at Law

GREAT Lakes Towing Co. v. Masaba Steamship Co., 237 *Federal Reporter* 577, is authority for the declaration that upon receiving or being reasonably chargeable with notice of the approach of a vessel, failure either to open the draw or the lift of a bridge maintained across a navigable river (Cuyahoga river at Cleveland, O.), or, if the facts justify, seasonably to notify the approaching vessel that failure to open or delay in doing so is unavoidable, raises a presumption of negligence which the owner or operator of the bridge must overcome, and failure of the owner of such a bridge to provide means by which the operator can signal approaching boats in the daytime is in itself evidence of negligence.

* * *

The so-called moratorium or prohibition against withdrawal of bank accounts is not a sufficient defense to an action in the United States for breach of duty to refund in Marseilles certain passage money, it appearing that though the moratorium proved a hindrance or annoyance, it did not render performance of the obligation impossible. The court which decided as above, in the case of *Foster v. Compagnie Francaise de Navigation a Vapeur*, 237 *Federal Reporter* 858, also held: "The making of a contract for passage from France was reasonably to be interpreted as subject to provisions relating to governmental direction and acts, as well as to interference because of conditions of war, particularly if set forth on the ticket. The passenger, who ran the risk of a declaration of war by his presence in the foreign country, cannot claim as a breach of contract those acts which show inability to perform the contract, though possibly unnecessary and extravagant anticipatory measures by the governmental authorities."

* * *

Under ordinary circumstances a charterer may assume that the vessel is reasonably fitted for the purpose for which her owner hired her, and a charterer of a scow to lighter a ship is under no duty to equip the scow with pumps and have a tug alongside of her, in order to control any leak that the scow may spring.—*Naylor & Co. v. Terminal Shipping Co.*, 237 *Federal Reporter* 725.

* * *

Inland Navigation Rules, act of June 7, 1897, c. 4, § 1, art. 18, rule 9, providing that whistle signals for steam vessels meeting, passing or overtaking are never to be used except when steamers are in sight of each other, etc., does not relieve a vessel of the duty to give alarm signals required by rule 3, whenever for any cause one of the approaching steam vessels fails to understand either the course or intention of the

other. *VIRGINIAN*, 238 *Federal Reporter* 156.

* * *

A steamship company is not liable for its failure to land a passenger at a regular stopping place, if because of stress of weather it was dangerous to do so, but such company, it was held in *Lee Line Steamers v. Page*, 237 *Federal Reporter* 57, owed a duty to such passenger to notify her that the boat would not stop at such place, and not to deceive her as to the place where the boat actually landed, and thus to induce her to land at a place other than the destination named in her ticket, and such company must respond in damages for any injuries such passenger has suffered, and which are directly and proximately attributable to its breach of duty in that regard.

* * *

Frozen meat intended for the Italian army, carried by a Dutch vessel from the United States to an Italian port during the present war in Europe, was held, in the case of *Atlantic Fruit Co. v. Solari*, 238 *Federal Reporter* 217, to be "lawful merchandise", within a charter party limiting the vessel's use to the carriage of such merchandise between safe ports in the United States and the Mediterranean, not east of the west coast of Italy, charterers' option trading to safe French Atlantic ports not north of Brest and safe South American ports not south of the river Plate, the exportation of contraband not being prohibited by the laws of the United States.

* * *

The provision of the charter of the Ship Owners' Association that a vessel be permitted to carry her usual deck load, but at shipper's risk, is manifestly one for the protection of the owners where the whole ship is chartered to a third party, it was decided in *CARLOS*, 237 *Federal Reporter* 731, and is a limitation upon the right of such third party to carry a deck load except at the shipper's risk. It was held further that loss of deck load of creosoted piles, which broke the stanchions and lashings when the ship listed, owing to heavy swells and cross-seas was not due to a peril of the sea but to being improperly stowed to meet the ordinary incidents of the voyage.

* * *

Whether a vessel was seaworthy for the transportation of a cargo depends, according to the case of *JEANIE*, 236 *Federal Reporter* 463, on the question whether she was "reasonably fit to carry the cargo which she had undertaken to transport." Applying the rule to the facts, the court held that where a portion of a cargo of salmon was loaded in a hold in which there was

some coal, and nothing was done to keep them separate, the vessel was not in a seaworthy condition, though the coal was afterwards removed, it appearing that the hold was not thoroughly cleaned, and water entered, because of a loose plank and of insufficient tarpaulins over the hatches. The court decided, on its being shown that the salmon was damaged to such an extent that it had to be reconditioned before marketing, that the shipper could recover the amount of his loss from a decline in the market price during the time necessarily required for such work.

* * *

Shipping articles for a voyage "from the port of New York to Iquique, Chile, and such other ports and places, in any other part of the world, as the master may direct, and back to New York, a final port of discharge in the United States, for a term of time not exceeding 12 calendar months," were in controversy in the case of *CATALONIA*, 236 *Federal Reporter* 554, and the court decided that the language quoted does not mean that the seamen bound themselves to take as many voyages from this country as the master of the ship might wish to make to any place or places in the world, provided he returned to New York within 12 calendar months. The court concluded that the articles involved contemplate a single voyage from New York, and back to a port of discharge in the United States, not to cover a longer period than 12 months.

* * *

Revised statutes of the United States, section 4530, as amended by the act of March 4, 1915, chapter 153, section 4, declaring that every seaman on a vessel of the United States shall be entitled to receive on demand from the master of the vessel one-half of the wages which he shall have then earned at every port where such vessel, after voyage has been commenced, shall load or deliver cargo before the voyage is ended, provided, such a demand shall not be made before the expiration of nor oftener than once in five days, was construed in the case of *Jacob N. Haskell*, 235 *Federal Reporter* 914. The court there held that congress intended that the master of the ship should at all times have in his hands to the credit of the seaman a sum equal to that which has been paid to him out of the wages earned until the end of the voyage, and that, where a vessel remains in port five days after one payment has been there made, seamen are entitled to another payment, which in any case need be of one-half only of the amount earned since the last previous payment, leaving in the master's hands one-half the wages earned during the voyage until its termination.

4-Year Test of Motorship Fleet--II

In This Installment Interesting Information Showing the Actual Details of Operating Costs and Revenues of the Big East Asiatic Co. Are Presented

THE East Asiatic Co. has built up its business along different lines than most other large steamship companies. Instead of confining its business to operating its large fleet, the company carries on extensive trading and manufacturing activities. It owns and operates factories in Denmark and other countries, and is the owner of large plantations in the far east.

The growth of the company since its organization in 1897 has been remarkable. It is one of the two Danish concerns which handle the bulk of Denmark's overseas trade. These companies are Det Ostasiatiske Kompagni (East Asiatic Co.) and Det Forenede Dampskibs Selskab (United Steamship Co.). The scope of the East Asiatic Co.'s operations are gathered from the accompanying map, and just recently the company has begun irregular service on two routes not shown on the map—via the Panama canal to Australia and to Vladivostok.

The European war has interfered with the company's ambitious plans for expanding its motorship fleet. The pioneer in this field, the company has completely changed the character of its fleet and now operates only motorships. At the end of 1915, for instance, the company had 23 ships

with a total cargo capacity of 237,200 tons under construction. When these are delivered, the company will have a fleet of about 40 seagoing motorships with a total deadweight tonnage of about 350,000.

In addition to the data on the results of the company's experiments with motor ships which *The Marine Review* has secured, other information showing the operations of the company since its organization has been obtained. This information discloses among other things, the average cost of its vessel per deadweight ton.

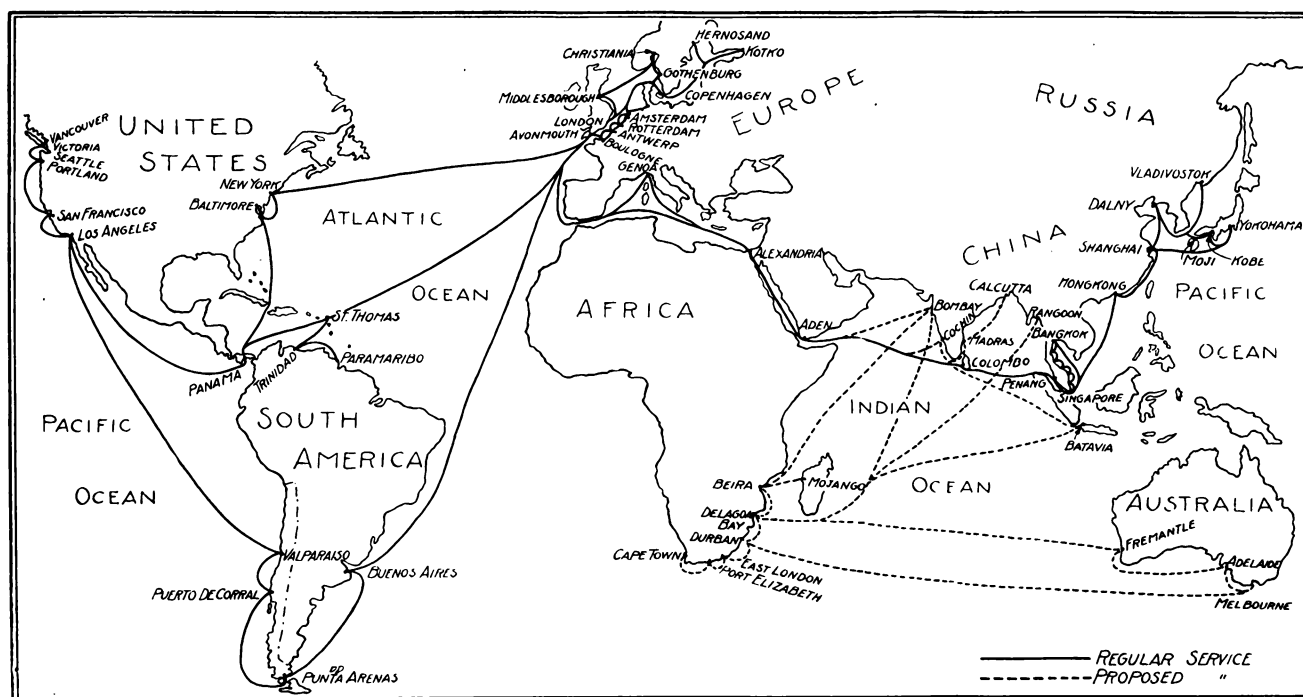
Increase of Services

The 1911 report in an interesting comparison of the operations in the periods 1897-1906 and 1907-1911 pointed out that "in the shipping trade of the company, the chief events of the years 1907-1911 were the increase and extension of its steamship services. Its primary steamship service, the line to the East Indies and the far east, included occasional calls at Bangkok. This line was divided in 1907 into two separate lines, the China-Japan line and the Bangkok line. The former line carries on a regular 3-week service to China and Japan together with the Svenska-Ostasiatiska Kompaniet (the Swedish East Asiatic Co.) which was started in 1907, while the Bangkok line maintains a 4-week steam-

ship service from Copenhagen—via Middlesbrough, Antwerp and Genoa—to India, Straits Settlements and Bangkok, calling at London on the return voyage. With one exception the original steamers trading to the far east have been replaced in the intervening period by new, larger and more modern steamers, specially built to meet the particular requirements of either line. For the Bangkok trade, which is at present served by five steamers, three further vessels are building.

"The local coast service:—Bangkok—the Malay coast—Singapore, was extended in 1907 by opening a coast line along the eastern side of the Gulf of Siam, between Bangkok and Kratt, which has been a means of increasing the commercial operations of the company in Siam. The four steamers of the service have been increased to nine, and in 1908 the line was transformed into a separate Siamese Limited Co., the majority of shares in which is held by the East Asiatic Co., which is also, as managing owner, in charge of its working. Also, the South Africa line has undergone a brisk development during the period under review. In addition to the company's own steamers, it has been found necessary to keep a large number of chartered steamers on the trade.

"In connection with the West India



EAST ASIATIC CO.'S FLEET PLIES FIVE OF THE SEVEN OCEANS

line, which since 1907 has been working with three new steamers, an additional steamship service to the Pacific coast of America by the Straits of Magellan was started about the end of 1911 for the purpose of taking advantage of the great possibilities

siderably increased in 1908 by new concessions for a period of 30 years, which have secured to this part of the forest work as well as to the sawmill in Bangkok and to the teak business, an undisturbed development for a long time to come. The planta-

1910. The capital and such parts of it as has been called up at various periods within the period of 1907-11, are as follows:

Year.	Share capital, Kroner.	Average capital at disposal, Kroner.
1907.....	15,000,000	15,000,000
1908.....	15,000,000	15,000,000
1909.....	15,000,000	15,000,000
1910.....	25,000,000	17,000,000
1911.....	25,000,000	15,000,000
		87,000,000

"According to this, the annual average disposable capital is 17,400,000 kroner, as compared with 5,967,389.86 kroner in the preceding period of 10 years. The annual average capital during the first 15 years accordingly amounts to 9,778,259.91 kroner.

"The dividends paid during the past five years, including the 8 per cent proposed for 1911, aggregate 7,600,000 kroner, or 8.74 per cent per annum on the capital employed. The corresponding figures for the decade of 1897-1906 were 4,796,194.93 kroner, or 8.04 per cent. Compared with the decade, the dividends of the past five years have risen by 2,803,805.07 kroner. The total of dividends paid during the first 15 years of the company's life, thus amounts to 12,396,194.93 kroner, equal to 126.77 per cent on the capital employed during that period, or at the rate of 8.45 per cent, per annum.

"From 1907 to 1911, a total of 3,400,000 kroner (including the sum proposed for 1911) was appropriated toward the reserve fund, as compared with 3,350,000 kroner during the first decade. The former includes ordinary reserves of 1,300,000 kroner, or 7.47 per cent, and a special reserve in connection with the issue of shares in 1910 of 2,100,000 kroner, or 16.1 per cent on the average capital employed. Thus the reserve fund appropriated during the first 15 years will amount to 6,750,000 kroner, or 27 per cent on the present share capital at the end of 1911.

"Of the previous debenture loans which were increased to 5,000,000 kroner in 1905, and of which 250,000 kroner were redeemed in 1906, a total of 1,250,000 kroner was repaid during the five years. The debenture debt, including the 5,000,000 kroner debentures issues in 1909, thus stands at 8,500,000 kroner at the end of 1911.

"The average amounts of the debenture loans employed in each particular year of the period 1907-11 are as follows:

	Kroner.
1907.....	4,687,500.00
1908.....	4,437,500.00
1909.....	6,270,833.33
1910.....	8,937,500.00
1911.....	8,687,500.00
	33,020,833.33

"The annual amounts thus employed averaged 6,604,166.67 kroner, as com-

1915 Operations of East Asiatic Co.

PROFIT AND LOSS ACCOUNT FOR THE YEAR

	Kroner ore	Kroner ore
Freight and passage money.....		29,880,412.30
Trading profit		4,786,332.08
Dividends from investments in other companies		2,849,821.88
Branch trading profits		2,908,781.31
Balance brought forward from last year..		496,902.63
		40,922,250.20
Administration Expenses, at Head Office, London Office and Branches.		
Salaries	Kroner	
Rent, postage, books, stationery, etc.....	1,296,254.09	
Sundries	375,501.43	
Steam Launches, etc., at branches and steamers' sundries	291,747.85	
	116,398.37	
Taxes		2,079,901.76
Set aside for extraordinary taxes and eventual differences of exchange on foreign currencies		373,954.27
Liners' Expenses.		5,500,000.00
Coal and oil	2,599,295.30	
Wages and provisions	2,039,308.11	
Suez canal, Panama canal and Harbor dues	1,820,109.26	
Consular fees	27,522.58	
Pilotage and towing.....	264,228.97	
Loading and discharging	1,615,326.40	
Classification, repairs, stores and maintenance	937,161.23	
Steamers on charter.....	838,602.36	
Agents' commissions	1,068,437.56	
Insurance	2,894,115.49	
Transshipment, conference rebates and claims	1,338,477.44	
Telegrams, advertisements and Sundries...	228,926.05	
	15,671,510.75	
Interest account	420,729.46	24,046,096.24
		16,876,153.96
Depreciation.		
On vessels, etc	1,698,781.16	
Office buildings, furnishing and fitting in Copenhagen and London.....	31,150.84	
At branches, on launches, sawmills, etc..	234,977.90	1,964,909.90
		14,911,244.06
Dividend to Shareholders.		
5 per cent on 25,000,000 Kroner.....		1,250,000.00
		13,661,144.06
Share of Profits.		
To the board 5 per cent.....	658,217.07	
To the managing directors 10 per cent...	1,316,434.14	
	1,974,651.21	
Less allocation to pension fund.....	950,000.00	
	1,024,651.21	
To the employees 5 per cent.....	658,217.07	1,682,868.28
		11,978,375.78
Reserve Fund.		
Allocated		4,000,000.00
		7,978,375.78
Pension Fund.		
Allocation mentioned above.....		950,000.00
		7,028,375.78
Additional Dividend to Shareholders.		
25 per cent on 25,000,000 Kroner.....		6,250,000.00
Balance carried forward to next year.....		778,375.78

that will present themselves in a couple of years through the opening of the Panama canal.

"The import and export branches of the company's business show a continual improvement. The export department has broken new ground. The company's teak concessions in the northern part of Siam were con-

tion work, which was only springing into existence in the first decade of the company's history, has grown into a very important part of the company's business during the years 1907-1911.

"At the end of 1906, the company's capital was 15,000,000 kroner (one krone equals 26.8 cents). This was increased to 25,000,000 in September,

pared with 2,349,166.67 kroner during the first decade of the company's life and 3,767,500 kroner during the first 15 years.

"The working capital of each particular year of the period 1907-11 (including share capital, debenture loans, reserve fund, and pension fund as well as the annual balances brought forward) is as follows:

	Kroner.
1907.....	23,467,845.73
1908.....	23,706,365.18
1909.....	25,491,741.31
1910.....	30,474,819.20
1911.....	40,403,722.12

143,544,493.54

"The annual working capital during the period 1907-11 accordingly averages 28,708,898.71 kroner, as compared with 9,056,233.91 kroner in the first decade, the increase being 19,652,644.80 kroner. The annual working capital of the first 15 years of the company averages 15,607,122.17 kroner.

"During 1907-1911 the company has ordered, and taken delivery of, 16 steam and motor vessels—three of which were intended for coast trade in Siam—of 50,469 gross register tons and 75,585 tons deadweight, at a total cost price of 13,676,281.90 kroner. Ten of these vessels were built by Danish builders and cost 7,509,321.82 kroner in all.

"The average cost per dead weight ton, owing to the cheaper prices of steamers, has been lower during the last five years, as is shown by the following comparative table, which shows also the average price per deadweight ton of the whole of the company's fleet:

	China-Japan Line.	Bangkok Line.	W. India Line.
	Per ton d. w.	Per ton d. w.	Per ton d. w.
	£ s. d.	£ s. d.	£ s. d.
1897-1906.....	10 2 4	12 19 7	12 19 7
1907-1911.....	7 7 5	9 15 9	12 5 9
1897-1911.....	9 12 2	9 15 9	12 13 8

"As is shown by the table, the price per ton varies according to the localities where the vessels are employed and their consequent type.

"At the end of 1911, the company's fleet, including ships building, consisted of 17 steam and motor vessels of 64,987 gross register tons and 100,485 tons deadweight, as compared with 21 steamships of 55,940 gross register tons and 81,600 tons deadweight on Dec. 31, 1906. Though the number of ships is less, the tonnage has grown by 9,047 gross register tons and 18,885 tons deadweight during the last five years. The company has transferred during that period a coasting fleet of nine ships to the Siam Steam Navigation Co., as referred to above.

"The total cost price of the 17 vessels mentioned amounts to 16,604,267.85 kroner, or 171.27 kroner (£9 8s 2d) per deadweight ton as com-

pared with 17,944,318.08 kroner, or 219.90 kroner (£12 0s 2d) per deadweight ton during the period from 1897 to 1906. The book value of the vessels was 10,902,976.52 kroner altogether, or 133.61 kroner (£7 6s 1d) per deadweight ton at the end of the decade, whereas at the close of the period 1907-11 it aggregated 14,350,237.07 kroner, or 142.81 (£7 16s 11d) per deadweight ton.

"The corresponding figures in respect of the average age of the ves-

pealed by the law passed Jan. 1, 1909.

"During the years 1907-11, 192 steamships of 643,345 gross register tons have called at Copenhagen for the account of the company, all of them loading and discharging in the free port, at which 73,213 tons of cargo were loaded for ports overseas, while 121,562 tons were discharged, partly for transshipment.

"The following is a comparative table, furnishing particulars with regard to the steamers calling at Copen-

1915 Operations of East Asiatic Co.

BALANCE SHEET FOR THE YEAR

ASSETS.

	Kroner ore	Kroner ore
Stock of commodities at Copenhagen and in foreign ports		4,772,770.75
Sundry cargoes of soya beans partly floating and partly ready for shipment.....		8,525,867.38
Vessels, book value.....		22,199,722.35
Payments on new construction.....		1,204,388.35
Lighters.....		417,902.12
Sundry debtors.....		10,977,627.87
Cash account.....		12,340.26
Cash in sundry banks.....		26,188,975.03
Branches and agencies.....		11,142,842.53
Office buildings and inventory.....		964,204.52
Capital invested in other companies.....		12,602,032.22
Vessels, current voyages.....		632,166.12
		99,640,839.50

LIABILITIES.

	Kroner ore	Kroner ore
Capital account.....		25,000,000.00
Reserve fund.....	10,000,000.00	
Allocation for 1915.....	4,000,000.00	
Allocation from profit on ships sold.....	6,000,000.00	
		20,000,000.00
Pension fund.....	1,000,000.00	
5 per cent interest for one year.....	50,000.00	
Special allocations.....	950,000.00	
		2,000,000.00
Debentures:		
5 per cent loan, 1905.....	2,750,000.00	
Less drawn and redeemed on Oct. 1, 1915.....	250,000.00	
	2,500,000.00	
5 per cent loan, 1909.....	5,000,000.00	
5 per cent loan, 1913.....	10,000,000.00	
		17,500,000.00
Reimbursement accounts.....		10,348,836.29
Interest account:		
3 months' interest on 2,500,000.00 kroner.....	31,250.00	
5 months' interest on 5,000,000.00 kroner.....	104,166.67	
5 months' interest on 10,000,000.00 kroner.....	166,666.67	
		302,083.34
Bills payable.....		4,398,502.51
Sundry creditors.....		4,630,173.30
Set aside for taxes and eventual differences of exchange		5,500,000.00
Share of profits to board, managing directors and employees.....		1,682,868.28
Dividend for 1915.....		7,500,000.00
Balance carried forward to next year.....		778,375.78
		99,640,839.50

sels are about 7½ and 4 years per deadweight ton respectively.

"The total freight and passage money earned during the decade was 39,710,273.71 kroner, as compared with 37,597,497.58 kroner for the period 1907-11, the grand total of freight and passage money earned since the formation of the company being thus 77,307,771.29 kroner.

"While the import duty paid to the state aggregated 373,352.85 kroner, during the first decade, it only amounted to 27,403.20 kroner during the last five years, making a total of 400,756.05 kroner. The comparatively small amount of the last five years is due to the fact that the import duty on steamships built abroad was re-

hagen for account of the company:

	1897-1906	1907-'11	1897-1911
No. stms. call'g	224	192	416
Gr. register tons.	718,723	643,345	1,362,068
No. stms. loading and discharging in free port....	201	192	393
Tons, loaded.....	72,090	73,213	145,303
Tons discharged.	118,097	121,562	239,659

"From this table it will appear that the company's steamers have loaded and discharged in the free port of Copenhagen during the last five years considerably more than the aggregate quantity of goods handled there during the preceding 10 years, or, in other words, that the work has been more than doubled during the latter and shorter period. The same condition, in general, holds good of the total of cargo conveyed, seeing that

during 1907-1911, 1,400,317 tons of goods were conveyed in the company's steamers, which comes very near the 1,402,352 tons of the preceding decade. Since the formation of the company in 1897 it has provided for the conveyance of 2,802,669 tons of goods.

"The total of passengers during the years 1907-11 was 6,415. The striking difference between the numbers of passengers carried during the decade and during 1907-1911 is due to extraordinary circumstances, particularly the large troop transport, in which the company participated during the Boxer rising and the war in the far east. Altogether the company has carried 55,945 passengers on its different routes since 1897.

"The exports from Europe through the company's head office have aggregated 17,396,483.54 kroner during the years 1907-1911. Out of this total, Denmark has supplied goods to the amount of 5,153,510 kroner.

"The aggregate exports from Europe by the head office during the company's first 15 years total 56,772,473.94 kroner. The following is a comparative table of the company's exports during the periods under review:

EXPORT	1897-1906.	1907-1911.	1897-1911.
	Kroner.	Kroner.	Kroner.
Europe	39,375,990.40	17,396,483.54	56,772,473.94
Denmark	4,971,448.78	5,153,510.20	10,124,958.98

"The larger exports during the first 10 years are due to the same cause as the larger number of passengers, that is, the Russo-Japanese war, during which the demand was extraordinary. Leaving the extraordinary sales out of consideration, the ordinary exports have increased by about 50 per cent. As far as the exports from Denmark are concerned they have more than doubled during the five years under review, owing largely to the quantity of cement exported.

"The total value of the imports by the head office from countries overseas to Europe during 1907-1911 amounts to 122,832,413.54 kroner. Compared with the first decade, when the corresponding amount was 41,336,466.78 kroner, the imports, in a period of half that length, show an increase of business amounting to 81,495,946.78 kroner. Out of the total import business of the last five years, goods amounting to 38,937,862.48 kroner went to Denmark, partly for trans-shipment, as compared with 20,138,591.63 kroner during the preceding 10 years.

"A comparative table of the total imports of the company through its first 15 years shows the following figures:

	1897-1906.	1907-1911.
	Kroner.	Kroner.
Imports.		
To Europe	41,336,466.78	122,832,413.54
To Denmark	20,138,591.83	38,937,862.48
		1897-1911.
Imports.		Kroner.
To Europe		164,168,880.32
To Denmark		59,076,454.31

"The stores and provisions department, which was formed as a special department in 1900, has since supplied provisions and stores to the vessels controlled by the company. While during the first year the supplies amounted only to 47,891.70 kroner, they were 1,005,429.35 kroner in 1911, and aggregated 6,716,003.53 kroner for the years 1900-11.

"The company, since the enactment of the new laws on taxation, has paid, for the years 1905-10, state and municipal taxes amounting to 294,846.35 kroner, including tax on the premiums gained through issue of shares, and allocated to the reserve fund.

"According to a decision recently given by the Supreme Court (of Denmark), such premiums are considered as investments of capital on which, under the law, no tax can be levied. The amounts paid in excess on this account are, therefore, expected to be refunded to the company.

"At the end of 1911 the company had about 10,000 persons in its service, to which should be added a large number of people doing temporary work under its different departments, such as loading and discharging of the company's vessels, etc. The organization of the company has kept pace with its growth, and is equipped to carry it on with the same activity as that with which it has been conducted during the past 15 years."

Buy Large Interest

Pacific coast shipping interests are understood to have purchased recently a large share of stock of the Chester Ship Building Co., Chester, Pa., having been unable otherwise to place contracts for boats, Pacific coast yards being already full to overflowing. Ships being constructed at Chester will be put in service from San Francisco, Seattle and other United States ports to Hawaii and the Philippine islands.

Book Reviews

Steam Turbines, by William J. Goudie; cloth, 519 pages, 5 x 8½ inches; published by Longmans, Green & Co., New York; and furnished by *The Marine Review* for \$4 net.

Although *Steam Turbines* was written primarily for engineering students, the methods of calculation outlined will be valuable to engineers who have to deal with the design and operation of steam turbines. The first portion of the text is devoted to a description and classification of the various types of turbines in common use. This section is followed by chapters devoted to discussions of the impulse, reaction and combination turbines. After a clear exposition of the different types of turbines, the

author presents considerable material in regard to the fundamental parts of turbines. The properties of steam and the fundamental characteristics of entropy diagrams are explained and their relation to the steam turbine is emphasized. The practical engineer will appreciate the chapters on nozzles, blading and rotors in which the functions of each are set forth in a clear, concise fashion readily grasped. The exposition is further simplified by a number of actual examples which are completely worked out showing the application of principles and the purpose of the several formulas. The proper operation to secure efficiency and to eliminate mechanical losses is fully outlined in several chapters devoted to actual operating conditions. The book is nicely illustrated with diagrams and charts, which serve to make the text more complete.

Practical Marine Engineering by Professor W. F. Durand; revised and enlarged by Captain C. W. Dyson, U. S. N.; 1,000 pages; published by the Aldrich Publishing Co., and furnished by *The Marine Review* for \$6 net.

The fourth edition of *Practical Marine Engineering* has recently been issued. The book as originally published was a valuable asset to those interested in the practical side of marine engineering. In its revised state it is even more complete and should appeal to the engineer and the student, and should have particular value for those who are preparing for examinations for marine engineers' licenses for all grades.

The author goes very completely into the details regarding marine engines and the kinds of fuel used on ship-board. Boilers, reciprocating engines, steam turbines and reduction gears (mechanical, hydraulic and electric) are treated exhaustively. Also there is much interesting data on auxiliary machinery. Pumps, condensers, feed water heaters, indicators, etc., etc. are described and their uses discussed.

The general subject of calculations for marine engines is covered and assistance is furnished in mathematics to those who need such aid. The book is illustrated with 550 diagrams and cuts showing approved practice in the different branches of marine engineering.

Oldest Steamer Sinks

The steamer *NORWICH*, built in New York by Lawrence & Snedden in 1836, sank at her pier at Kingston, N. Y., on March 19. She belongs to the Cornell Steamboat Co. and was the oldest steamboat in active service in America. *NORWICH* had a reputation as an ice breaker and was popularly known as the Ice King. She has been engaged almost continuously in towing on the Hudson river. She will be raised and put back into commission.

Raise Old Bark From African River

Manga Reva Was Bought for \$5,000, Raised and Repaired, Sold for \$300,000, Figured In International Complications, and Sunk

TO BE resurrected from a watery grave where she had lain for 15 years and afterward to figure in international proceedings on two separate occasions, only to founder a few hours after leaving port is the unusual experience, even in these days of unusual experiences of the American bark MANGA REVA. This vessel a few months ago, was raised from the mud at the mouth of a Liberian river and loaded with a cargo, towed to this country and repaired and refitted throughout. She was then loaded by the Freighters' Transportation Co., 42 Broadway, New York City, with a cargo of tobacco valued at \$500,000 and cleared from Baltimore for Rotterdam. A few weeks later, the London office of Davies, Turner & Co., who acted as agents for the Freighters' Transportation Co., cabled that the bark was being detained under orders of the British admiralty, off the Downs, below Falmouth, due to the fact that she was not provided with the Netherlands Overseas Trust Co. permits which Great Britain requires on all contraband goods consigned to Holland, as a guarantee that they will not be reshipped to Germany.

News of the detention was immediately communicated to the Freighters' Transportation Co., who brought it to the attention of the government, with the result that the state department cabled for further information from the United States solicitor general to the American embassy at London, and from the proper British



FIG. 1—E. FREDERICK WEILL, VICE PRESIDENT, FREIGHTERS' TRANSPORTATION CO., CHARTERER, AND CAPT. JOSEPH G. PARK OF MANGA REVA

authorities. It was then established that tobacco had not been added to the list of contraband until Sept. 1, while MANGA REVA had sailed Aug 21, and thus the Netherlands Overseas Trust Co. certificates were not required. As a result, the vessel was released, after having been detained four or five days. Nothing as yet has developed as to the matter of redress for the delay to which the vessel was subjected but her agents

hope some day to recover for the four or five days which she lost.

Thus ended the first international complication. MANGA REVA then proceeded to Rotterdam, in tow of an ocean-going tug, since it is not considered safe for sailing vessels to negotiate the mine-strewn waters off Holland unaided. At Rotterdam, she again got into international difficulties. The vessel was permitted to discharge her cargo but the Netherlands Overseas Trust Co. refused to clear her from the port unless certain conditions were fulfilled. One of these was that the owners of the vessel give bond that the vessel's range of sailing, following her departure from Rotterdam, be confined to certain ports, not including any in belligerent countries. Her owners lodged a statement of the case with the state department at Washington and for a time refused to consent to this arrangement. The loss of revenue due to the ship's idleness pending a decision by the American and Dutch governments, however, threatened to reach such proportions that the owners, under protest, on Oct. 23, signed the agreement and deposited a bond of \$10,000 with the Netherlands Overseas Trust Co. A second protest has been filed with the state department by the Freighters' Transportation Co., through the London correspondent of its New York lawyers, who also have taken the matter up with the Dutch government.

The bark sailed from Rotterdam on her return trip on Nov. 2, carrying 1,500 tons



FIG. 2—BOW OF THE RESURRECTED TRAMP WHICH FOUNDERED OFF THE FRENCH COAST



FIG. 3—MANGA REVA, REBUILT AND REFITTED, TAKING ON CARGO AT BALTIMORE

of sand ballast, and, after being detained for several days off Falmouth by the British naval authorities for examination, she got away from the Downs on Nov. 15. The last heard of the ship was a wireless call for help off the coast of France on Nov. 20, when the steamer RYNDAM picked up this message:

"Come as quickly as possible. Am drifting before the wind with no boats."

The message was relayed to the American ship ROCKINGHAM, which was nearer to the disabled ship. No report has ever been received that any of her boats were picked up and she has been given up as lost by her owners.

MANGA REVA's history is an interesting one. Had it not been for the war, the bark probably would still be buried in the mud just off the western coast of Africa, as the expense of raising and repairing her in ordinary times, would

am told the cargo brought \$40,000, practically paying for raising and towing."

At Baltimore, the salvaged bark was placed in dry dock and completely refitted. She emerged with four wooden masts, a wireless outfit, electric lights throughout, two 3-ton steam winches, four cargo booms, a donkey engine, and other features which went to make her a first-class sailing vessel. After being completed, she was sold to J. M. Getsky, Baltimore, for \$160,000, and in less than a month the Brynhilda company bought her for \$300,000.

MANGA REVA was one of the largest steel barks under American registry. She had a length of 284 feet, 42.5-foot beam and 24.7-foot depth. Her cargo tonnage was 3,500 and her net tonnage 2,240. She was provided with two decks and three hatches. She was an exceedingly fast sailer, her speed averaging 10 knots. MANGA REVA originally was known as PYRENEE. She was built at Glasgow, Scotland, in 1891.

Book Reviews

Navigation Notes and Examples, by S. F. Card, cloth, 230 pages, $4\frac{1}{2} \times 8\frac{1}{2}$ inches; published by Longmans, Green & Co., New York; and furnished by *The Marine Review* for \$2.40 net.

To the student of navigation who has mastered the elements of nautical mathematics and who is familiar with the various navigating instruments, *Navigation Notes and Examples* will prove a most helpful and practical treatise. No attempt has been made in these notes to give either a description of the various instruments or instruction in their use and a study of the book demands access to charts. The examples will, however, be of great assistance to the student who desires to augment his theoretical education with a practical application of the fundamental principles. The arrangement of the notes is such that frequent reference to remote parts of the text is almost entirely eliminated. The specimens apply to nearly all calculations necessary to the mariner in computing the bearing of the ship, the allowance for tidal streams or currents, correction of compass, the use of tables and charts and the determination of time. In practical use, the notes will prove particularly valuable in cases where the examples parallel the case at hand. In general, as a series of exercises on computation, the examples with their included answers should be worthy of attention if the old saw "practice makes perfect" still holds true.

Pacific Ports (Frank Waterhouse & Co., Seattle), edited by Welford Beaton, cloth, 350 pages, $4\frac{1}{2} \times 7\frac{1}{2}$ inches; published by the Terminal Publishing Co., Seattle, and furnished by *The Marine Review* for \$3 net.

The third edition of *Pacific Ports* is

a remarkably comprehensive reference on commercial geography, terms of commerce, transportation systems and general marine information. Starting with Alaska on the north, its geographical section includes the west coasts of Canada, United States, Central and South America and embraces the islands of the Pacific and follows the eastern coast of Asia to Siberia. It gives a short description of each country and states concisely the customs regulations to be followed by importers and exporters. Facsimiles of requisite consular documents and detailed information in regard to harbors are included in this section. In the commercial section of the book are given the sources of supply of the world's commodities and a dictionary of the names, sources of origin and uses of almost everything that enters into commerce. The United

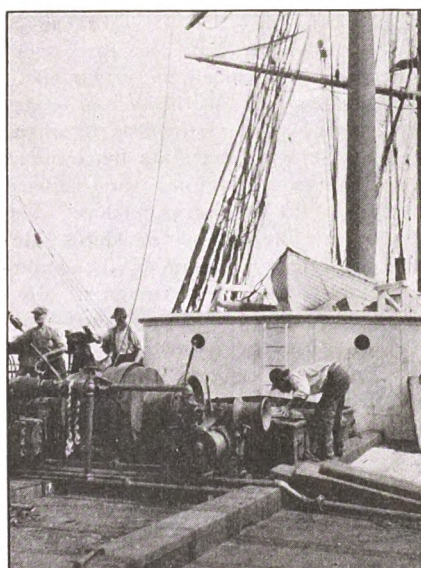


FIG. 4—VIEW OF FORE DECK, SHOWING WINCHES

have been prohibitive. At the office of the Freighters' Transportation Co., which had the craft under charter from her owner, the Brynhilda Shipping Corporation, 52 Broadway, New York, the story is told as obtained from the bark's captain, Joseph G. Park:

"The bark had gone to Africa many years ago on a trading voyage from San Francisco and was wrecked a few miles above the mouth of a river on the Liberian coast," said the captain. "No effort was made to raise the hull as it was not believed the expense would justify it. Early last year an American shipping man who knew of the wreck and realized that vessels were worth four times as much as before the war, went to Africa and bought what was left of the bark for something less than \$5,000 and raised her. The hull was found to be intact, so he loaded it with a cargo of manganese ore and had it towed to Baltimore by a steamer. I

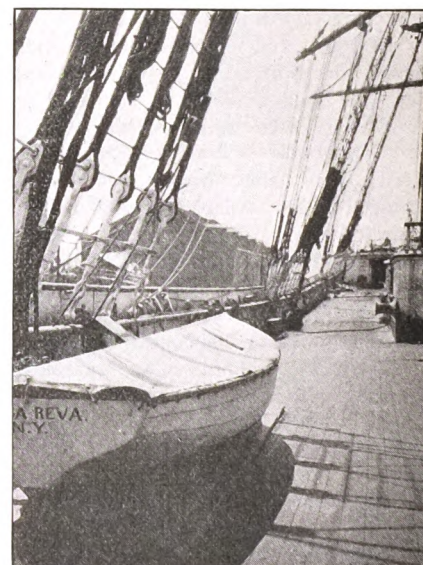


FIG. 5—VIEW OF AFTER HALF OF DECK

States customs are interpreted for the business man who does not care to take the time to go through involved government documents. The section devoted to tables of data are unusually complete. The moneys of the several countries are reduced to their American equivalents as also are the weights and measures. The table which indicates the freight on a given number of tons charged for on a measurement basis is particularly valuable. The distance tables are arranged so that it is comparatively easy to ascertain the distance between all points, even those of relative unimportance. The transportation section gives a list of transportation companies and considerable relative information. The book is printed on thin paper and has a flexible binding.

After colliding with the steamer BINGHAMPTON, March 19, the steamer SAGUA was beached to prevent sinking.

American Ship Yard Activities

A Snappy Summary of the Leading Events of the Month in the Vessel Construction Field

British Firms Place Big Ship Orders

IN THE weeks immediately preceding this country's declaration of war against Germany, the ambitious plans of the leading British shipping companies and of the British government itself to build a large number of ships in this country, were gradually being disclosed. With the backing of the British government, the Cunard Steamship Co. was understood to have decided to order 114 large passenger steamers from ship yards in the United States, at a cost of \$120,000,000. This fact was revealed by agents of the line at a meeting of representatives of the largest ship building plants in America, held in Philadelphia late in March. At about the same time attention was drawn to the entrance into the market of another large British shipping company of equal importance as the Cunard line and closely related to the government. The name of this company was not made public, but it was reported on good authority that if satisfactory arrangements could be made with the builders, contracts for upward of a dozen large vessels would be placed in this country. Shipping men believed that the sudden development of the demand from British owners resulted from the sanction and approval of the government, and saw in this possible evidence that the government is lending its support to the movement, toward consolidation of shipping ownership in Great Britain. The placing of contracts was carried on with as great secrecy as possible and was handled directly from the home offices, rather than through agents, it is said.

The new Cunard vessels will range in size from 8,000 to 17,000 tons. A large number of them will be built in Delaware river yards, such as the New York Ship Building Co.'s plant at Camden, the Cramp ship yard and the Harlan & Hollingsworth yards in Wilmington. The plant of the Bethlehem Steel Co. at Sparrows Point, Md., also will receive some of the order.

Shipping men regard the contracts as being practically governmental, as

the British government, since the war, has been heavily interested in the Cunard line. The determination to construct such an immense fleet of steamers is looked upon as evidence

German Tonnage in Neutral Ports

At this time, when Germany is destroying shipping without regard to flag or condition, and the seizure of German ships in American ports has been effected, it is interesting to note again the amount of German tonnage still tied up in neutral ports, particularly as there has been some talk, most recently in Holland of taking over German vessels to replace those sunk. In many instances the tonnage in neutral ports is not nearly as large as the amount that the neutrals have lost. Following is a summary showing the number and tonnage of German ships in neutral ports.

	No. of steamers.	Tons gross.
Argentina	38	195,483
Brazil	27	142,511
Canary Islands	21	84,296
Chili	31	175,265
Colombia	4	14,575
Colon	4	15,569
Denmark	2	3,516
Dutch East Indies.....	40	191,237
Greece	9	19,567
Holland	57	142,376
Mexico	3	14,067
Norway	55	80,148
Odde	1	17,082
Peru	4	18,133
St. Michael (Azores)....	2	7,091
Siam	9	19,252
Spain	42	118,962
Sweden	7	12,404
Talara	1	6,330
Total	357	1,277,864

SEIZED IN RECENT WEEKS.

China	9	19,808
Cuba	6	17,750
Hawaii	9	35,023
Philippine Islands.....	24	87,896
Porto Rico	1	3,537
Virgin Islands	2	7,712
United States	72	553,689
Total	123	725,415
Grand total	480	2,003,279

that the British government is determined to hold its standing as mistress of the seas, despite the ravages of the German submarines.

The first intimation that the Cunard company was seeking steamers of

American construction came in the middle of February, when contracts were closed for 12 steamships, at a cost of \$30,000,000, for the Royal Mail line, a Cunard subsidiary. The full extent of the Cunard line's building program was not revealed, however, until the Philadelphia meeting. Two weeks earlier, every ship yard of any size along the Atlantic coast received specifications from the Cunard company and was asked to send a representative to Philadelphia. At the meeting, the Cunard agents showed how gigantic were their plants.

Each ship building company was asked how much work it could undertake and what prices it would charge. The replies of the various companies were not made public, but it is understood that the combined American yards were found to be able to handle the entire contract.

Some Under American Flag

It is understood that the Cunard line is planning to place some of the new vessels under the American flag, thereby abandoning its custom of many years of being a purely British concern. This will be done for the purpose of entering the coastwise trade of the United States.

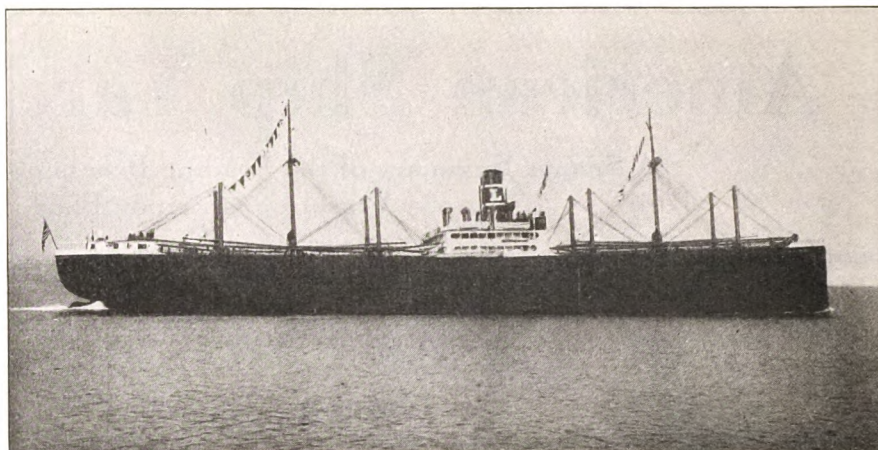
The placing of at least four more Cunard contracts was reported later. Two ships are to be built at the yards of J. N. Duthie in Seattle and another Seattle plant, the Ames Ship Building & Dry Dock Co., has received contracts for "more than one vessel," according to a man closely in touch with the industry. These four contracts brought the number of ships so far ordered by the Cunard line from American builders and of which announcement has been made, to 18. The 14 already announced are distributed as follows: Todd Shipyards Corporation, 6; subsidiaries of the Bethlehem Steel Corporation, 6; Sun Ship Building Co., 2. Great Lakes yards are known to have received large orders from the Cunard company. One such order is said to call for 33 boats of the same type; another for 17 sister ships.

The share which the Pacific coast yards will have in the Cunard ship building program is attracting considerable interest. Steel ship building in the west has been of more recent development than along the Atlantic coast, where several long established yards are now in operation, and the fact that the west is receiving so many contracts is regarded as indicating the extent of the progress that has been made during the war. The award of the British contracts to some of these yards is considered as making certain their establishment on a firm basis. It is reported that the Cunard line has purchased the contracts of two ships building at the Northwest Steel Co.'s yard, Portland, Ore., from L. Kloster, a Norwegian owner, and that the purchase of four others at the Northwest Steel Co.'s plant, two building at the yard of the Columbia River Ship Building Co., and two at the F. J. Duthie plant at Seattle, contracts for all of which are held by Mr. Kloster, is contemplated. The price which the Cunard line is said to have paid for the contracts is said to range as high as \$200 to \$205 a ton. The vessels purchased are freighters of 8,800 tons deadweight each.

Oil Burning Freighter

JULIA LUCKENBACH, launched Dec. 23, 1916, is the second of a fleet of five oil-burning freighters, now under construction by the Fore River Ship Building Corporation, Quincy, Mass., for the Luckenbach line of New York, to engage in the general carrying trade. EDWARD LUCKENBACH, the first vessel built under the contract, left the Fore River yards some weeks ago having fulfilled every requirement in her trials.

JULIA LUCKENBACH, like the other vessels of the fleet, was constructed to



HER DESIGN IS DISTINCTIVE

special designs for the Luckenbach Steamship Co. for its coast to coast and overseas' trade. Her length is 456 feet over all and she has a deadweight carrying capacity of 10,000 tons. In the adoption of the modified cruiser stern, the novel arrangement of bridge and deckhouse bulwarks, one large smoke stack amidships, she is a handsome vessel, as the illustrations show. Her wide spaced frames are specially designed for the economical carriage and rapid handling of general freight.

The vessel is driven by a single Curtis turbine, with high and low speed reduction gears designed to deliver 4,000 horsepower at 90 revolutions, the turbine being so arranged that the ahead and reverse turbines are carried on one shaft and contained in one case. Steam is furnished by three boilers of the Scotch marine type, the fuel oil being carried in the double bottom compartments and in the forward and after peak tanks.

Will Build Wooden Ships

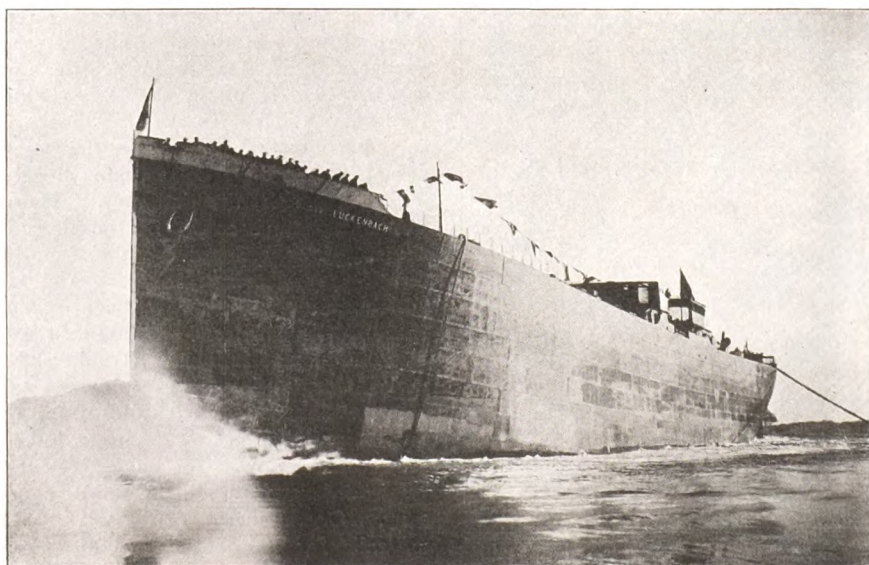
President John T. Donohue, of the Northern Transportation Co., Balti-

more, has announced that his concern has purchased the plant of the Manistee Iron Works, Manistee, Mich., which will be fitted at once to build six wooden barges for his company for use on the Atlantic coast. The property has a water front of 2,200 feet, and much machinery included in the purchase can be adapted to the proposed work. The barges will be driven by a type of oil engines which will make them independent of tugs. They are to carry 3,000 tons each of deadweight cargo.

Canada Plans Big Fleet

The imperial munitions board at Ottawa, Ontario, acting on behalf of the British government, has arranged for constructing vessels on a large scale at Canadian plants already in operation, and others which will be established shortly. J. W. Norcross, vice president and managing director of the Canada Steamship Lines, Ltd., has been appointed director of ship building in Canada, with full charge of the undertaking and power to organize a staff and place contracts. Orders to the amount of \$25,000,000 have already been placed, among the companies embraced in the plan being the Canadian Vickers Co., Montreal; Canada Steamship Co.; Polson Iron Works and Thor Works, Toronto; Collingwood Ship Building Co., Collingwood; Port Arthur Graving Dock & Ship Building Co., Port Arthur; and the ship building companies at Vancouver and Victoria. B. C. Ships under construction by the Canadian Vickers Co., at Montreal, for Norway, have been taken over, as have also three steel vessels in course of construction by the Nova Scotia Steel & Coal Co., at New Glasgow. It is understood that orders will be limited only by the capacity of the Canadian yards to fill them.

The preparations now under way seem to assure the establishment of



ENTERING THE WATER AT QUINCY, MASS.

a new and permanent ship building industry in Canada. It is estimated that orders to the extent of \$60,000,000 will be executed here as rapidly as possible. The permanence of the industry is the feature most emphasized by the British government and the imperial munitions board. It is regarded as assuring continuation of industrial activity after the war. The appointment of Mr. Norcross means that the industry will at the start be placed on a practical basis.

Plans are being made for the organization of new ship building concerns, which will operate on a large scale. One of these, the International Ship Building Corporation, has already

W. H. Varney, Seattle, superintendent of the Western Ship Building Co. In addition to the 360-foot vessel, the company also announces the completion of plans for building a 130-foot auxiliary schooner.

The largest of the two vessels will cost approximately \$370,000 and will be built along the lines of the famous old New England sailers. Her cargo capacity will be between 1,800,000 and 2,000,000 feet of lumber. She will carry five masts and will be built on the style of the "bald-headed" schooner, that is, she will not be fitted with topmasts. Captain Varney, designer of the vessel, learned his trade in the yards at Bath, Me., where he followed

Concrete Ship Ways at Quincy

Following soon after the announcement that the Fore River Ship Building Corporation, Quincy, Mass., had been awarded the contract to build one of the great battle cruisers, comes the decision to construct an entirely new set of ways to handle this great war vessel. Over \$500,000 will be spent for the work. To facilitate the erection of the ways, the Massachusetts state officials condemned the necessary land and the contractor, the Aberthaw Construction Co., Boston, has begun the surveying and soundings.

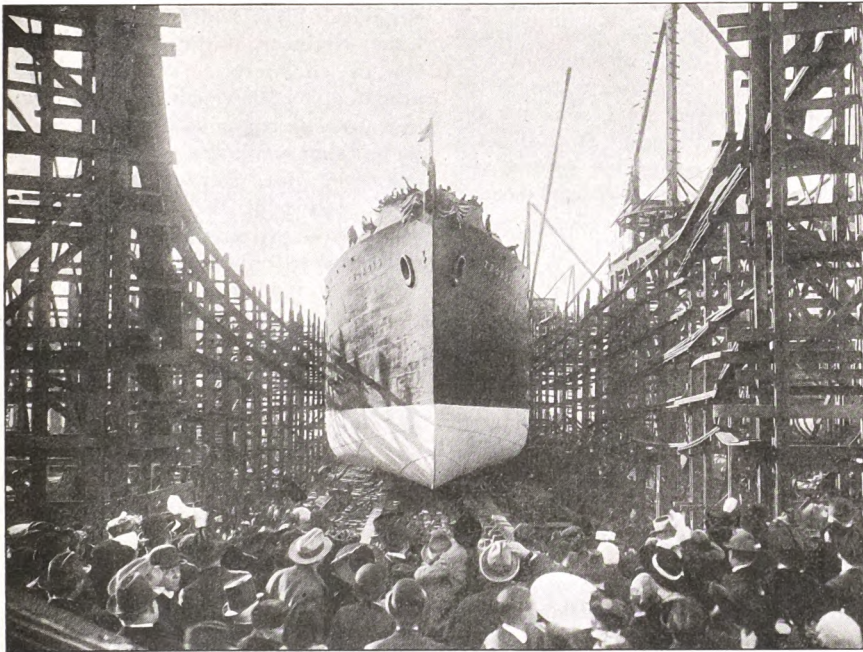
The new ways, it is announced, will be as large or larger than any in the world. They will be 990 feet long and will be fitted with electric cranes and overhead steel work embodying the most modern ideas for building vessels of all types. Even when one of the battle cruisers, which are the largest in the world, is lying on this set of ways, 125 feet of extra length will remain, indicating that the yard is preparing for a future growth in warships.

The heavy foundations, supporting crib for keel, blocks and launching ways are all to be concrete. Over 12,000 cubic yards of concrete and 3,000 wooden piles will be required and approximately 3,000 tons of structural steel will be used in erecting the crane ways. These will be 870 feet long and will carry one 50-ton and three 7½-ton cranes, all 120 feet span. The larger crane will run 121 feet above mean low water.

There has been little delay in getting to work, and while the ways are being built the shop work on the cruiser will go ahead rapidly. The Aberthaw company plans to complete the ways, ready for laying the keel, by Sept. 1.

Increases Capacity

The New York Ship Building Corporation has announced that it is increasing by approximately 50 per cent the capacity of its plant at Camden, N. J., for building the battleships COLORADO and WASHINGTON, and has also begun the construction of four standard freight steamships for its own account. Two of the vessels will be of 5,500-ton capacity each, and the other two of 4,000 tons each. The company also has laid down two freight and passenger steamships for W. R. Grace & Co., and two freighters for the International Mercantile Marine. The Grace steamers will be oil-burners of 5,000 gross tonnage each, with accommodations for 100 first-class passengers. Their length is 375 feet; beam, 51 feet 6 inches; depth, 33 feet 6 inches;



LAUNCH OF 7,100-TON TURBINE STEAMER THORDIS WHICH HAS JUST BEEN PERMITTED BY THE SHIPPING BOARD TO TAKE NORWEGIAN REGISTRY ON CONDITION THAT SHE CARRY TWO CARGOES FROM AMERICAN PORTS

been incorporated with an authorized capital of \$2,000,000. The seaboard provinces of the Atlantic have under consideration projects for lending assistance to ship building concerns on a similar basis to the legislation passed in British Columbia, which was successful in influencing the establishment of new enterprises on the Pacific.

New Pacific Yard

Officials of the Western Ship Building Co., whose yard is to be located at Gig Harbor, Wash., have announced their plans to build a 360-foot auxiliary schooner as one of the first vessels to be built at the new plant. This is said to be one of the largest vessels contemplated by any wooden ship building plant in the northwest.

Plans and specifications for the new vessel are about completed by Capt.

wooden hull construction for many years. Later he was employed in wooden hull construction by the United States government.

The Western Ship Building Co. was organized early in the winter, with A. B. L. Gellerman as president, when it purchased the interest of the People's Ship Building Co. Construction work on the two schooners, according to officers of the company, will begin just as soon as the yard can be prepared for operation. Workmen are now engaged in clearing the site and will begin work on the building ways in the near future.

Work is reported to have been started on two 4,000-ton wooden ships to be built for the Gaston, Williams & Wigmore Steamship Corporation in the new yards of Supple, Ballin & Lockwood, located at Portland, Ore.

draught, 24 feet, and speed, 14 knots loaded. These ships are especially designed with regard to the carriage of passengers and freight in tropical service.

The Mercantile Marine vessels, the ship building company's statement said, will be of 10,000-ton capacity each and are understood to be destined for use by the Atlantic Transport Co. They are 430 feet in length, with 56-foot beam and a draught of 27 feet 10 inches. They will make 11 knots when loaded.

Gear Makers Organize

An organization of gear manufacturers of the United States was effected at Lakewood, N. J., at a meeting held March 25 to 27. This organization will be known as the American Gear Manufacturers Association and its purpose will be to advance and improve the gear industry in a general way by the standardization of gear design, manufacture and application. The executive committee consists of the following: F. W. Sinram, Van Dorn & Dutton Co., Cleveland; H. F. Eberhardt, Newark Gear Cutting Machine Co., Newark, N. J.; F. D. Hamlin, Earle Gear & Machine Co., Philadelphia; Frank Horsburgh, Horsburgh & Scott, Cleveland; Biddle Arthur, Simonds Mfg. Co., Pittsburgh; George L. Markland, Philadelphia Gear Works, Philadelphia, and Milton Rupert, R. D. Nuttall Co., Pittsburgh. The following officers were elected: President, F. W. Sinram; vice president, H. E. Eberhardt; secretary, F. D. Hamlin, and treasurer, Frank Horsburgh. The next meeting of the association will be held at Pittsburgh, May 14 and 15.

New Delaware River Yard

The Fort Mifflin Ship Building Co., recently organized with a capital of \$10,000,000, has purchased 160 acres on the Delaware river at Philadelphia and will begin at once to erect a large ship yard. The property purchased occupies a mile along the river front just below the Schuylkill river and dredges will be put to work immediately to improve the site for the erection of docks and wharves.

Plans for the initial structure, 500 x 800 feet, to contain the various shop departments, have been already completed. The incorporators of the new company, which has been chartered under the laws of Delaware, are A. G. Steelman, C. P. Cannon and C. M. Dombey.

A proposition by the Alaska Steamship Co. to purchase the steamships GREAT NORTHERN and NORTHERN PACIFIC from the Great Northern Pacific Steamship Co. for \$3,250,000 has not been accepted.

Death of James H. Hoyt

James H. Hoyt, a leading attorney of Cleveland, and prominent for years in Great Lakes shipping affairs, died March 21 at St. Augustine, Fla. He was 64 years of age.

Mr. Hoyt had been nationally known, not only for his abilities as a lawyer, but for his patriotic and earnest devotion to governmental affairs. He was among the first rank as an after-dinner speaker. His interest in public questions had brought him into intimate contact with most of the leaders in federal and industrial life.

He was senior partner of the firm of Hoyt, Dustin, Kelley, McKeehan & Andrews, lawyers and proctors in admiralty, Cleveland. He was general counsel and director of the American Ship Building Co., director of the Cleveland-Cliffs Iron Co., a trustee of the Carnegie pension fund, secretary and director of the Pittsburgh Steamship Co. and other lake companies, second vice president, director and general counsel of the Hocking Valley railroad, secretary and director of the Lake Superior & Ishpeming railroad, and a director of several Cleveland banks and trust companies.

Death of John S. Hyde

John S. Hyde, president of the Bath Iron Works, Ltd., Bath, Me., died March 17 in St. Augustine, Fla., aged 50 years. He was one of the best known ship builders in the country, many warships having been turned out at Bath under his direction. He was born in Bath, March 15, 1867. After studying at the Massachusetts Institute of Technology and in Europe, he began work at the Bath Iron Works as an apprentice. After filling various positions, he became president and general manager in 1905. He was a member of several technical societies and had served as mayor of Bath, and as state representative and state senator.

Ships in Ballast

Over 13 ships of every hundred (13.88 per cent) making the transit of the Panama canal in 1916 went through without cargo, or in ballast. The total number of them was 174, of which 128 were passing from the Atlantic to the Pacific and 46 from the Pacific to the Atlantic. A factor in the preponderance of ballast ships from the Atlantic has been the practice of sending ships light to the Chilean nitrate ports to load quickly with nitrate for Europe and the United States.

The total net tonnage of the ships in ballast during the year was 459,745, according to the rules for measurement for the canal. This was composed of 409,619 tons from the Atlantic to the

Pacific, and 50,126 from the Pacific to the Atlantic. On the basis of net tonnage, the ballast ships formed 11.68 per cent of the aggregate net tonnage during the year.

Plan New Terminal

Plans for converting the water front at Bayonne, N. J., into a modern railway and steamship terminal, such as within recent years has been developed in Brooklyn, have been submitted to the Bayonne city commissioners by J. Spencer Smith, president of the New Jersey state board of commerce and navigation. The report embodying the plans was prepared by Benj. F. Cresson Jr., chief engineer of the board, and F. Van Z. Lane, engineer of the Bayonne chamber of commerce. The report was accepted by the commissioners who now have it under advisement. Should it be approved, the project will be presented for consideration at the next session of the legislature, after which the citizens of Bayonne will take a vote on it. Inasmuch as the project is a popular one, it is believed it will be approved and carried to completion with the minimum amount of delay.

The plans call for an expenditure of approximately \$7,235,000, and the site of the proposed terminal includes 400 acres now under water which will be reclaimed and 20 acres now above tidewater. This site will provide dockage for 30 modern freight steamships as well as for smaller craft. The plan also includes a large railroad yard, a ferry terminal, four miles of bulkhead platform, large bulkhead sheds and more than 200 acres will be set aside for the erection of industrial buildings. The site of the proposed improvements is on New York bay and extends from East Thirty-fifth street to East Forty-sixth street, Bayonne.

Harbor Expenditures at Philadelphia

In connection with the table on harbor expenditures in the United States, published in the April issue of *The Marine Review*, George S. Webster, director, department of wharves, docks and ferries, Philadelphia, points out that the city of Philadelphia should have been credited with liberal expenditures for its harbor. From 1854 to June 30, 1916, the city expended \$28,770,622.15. During the same period the state of Pennsylvania has appropriated \$1,775,000 and the Girard estate has expended \$2,477,209.71, a grand total of \$33,022,831.86.

On the Coasts, Lakes and Rivers

What's Doing and Who's Doing It

Prepare for Record Season on Lakes

By M. C. Lynch

THE 600-foot freighter being constructed at the Lorain yards of the American Ship Building Co. for the Pittsburgh Steamship Co., will be named HOMER D. WILLIAMS, in honor of the president of the Carnegie Steel Co.

* * *

The proposed new channel to straighten the Cuyahoga river can be dug in three years. The government will probably agree to pay the cost, according to Major Bond, federal engineer, who states that he believes the new channel can be cut without disturbing navigation in the old channel. It would probably take 10 years to complete the entire project.

* * *

The steel steamer NEVADA, of the Goodrich line, built at a cost of \$275,000 in 1915 for the passenger trade between Milwaukee and Chicago and equipped for winter traffic with ice-breaking bows, was sold, March 29, to the Russian government for \$750,000, for use in the freight trade to Russian ports.

* * *

The steamer TOURIST, of Put-in-Bay, made her last run on the Sandusky and Lake Erie islands route, March 24. Capt. Andrew Forbeck, Erie, Pa., who recently purchased the craft from Capt. E. L. Dodge, Put-in-Bay, said that running the boat had been unprofitable. She is now to be converted into a fishing tug.

* * *

The officers who will man the Northern Navigation Co.'s excursion steamers for the season of 1917, have been announced as follows: Steamer NORONIC; Captain, R. D. Foote; first officer, Alex Frazer; chief engineer, Samuel Brisbin; purser, F. D. Geoghegan; steward, S. Crossley. Steamer HAMONIC; Captain, A. L. Campbell; first officer, E. Walkinshaw; chief engineer, John Smith; purser, H. R. Storey; steward, J. E. Adams. Steamer HURONIC; Captain, A. M. Wright; first officer, E. Britton; chief engineer, J. McLeod; purser, F. J. Horning; steward, George Powell. Steamer WAUBIC; Captain, John Dube; chief engineer, Edgar Brisbin; purser, Charles H. Carruthers; steward, Miss Etta Smith.

* * *

Capt. Ralph Millard, for years master of tugs of the Great Lakes Towing Co.'s fleet, has accepted a position with the Woolson Spice Co. He will be marine salesman for the company, with territory extending from Montreal to Duluth.

* * *

With the unloading of the steamers GEORGE B. LEONARD and NORTH LAKE at the Frontier elevator, April 2, the winter storage fleet at Buffalo was declared free from grain. There were

over 80 boats in the fleet with over 25,000,000 bushels of grain.

* * *

W. C. Richardson & Co. have bought the steamer YUMA from the Wilson Transit Co. for the Owen Transit Co., which owns the steamer JOHN OWEN. W. C. Richardson & Co. also closed a deal for the stock of the Hopkins Steamship Co. and will take over the steamship CENTURION, which will be operated by the Mentor Steamship Co. The Mentor Steamship Co. was organized during the winter. The boats will be managed by Captain Richardson.

* * *

Contracts for seven ships of a total gross tonnage of 19,000 tons are held by the Toledo Ship Building Co. Six of the ships are for the Arthur R. Lewis Co., New York, and one is for the Great Lakes Steamship Co. All the Lewis boats are full canal size steamers of the Norwegian type and are to be used in coastwise trade. The contracts call for a speed of 10 knots an hour. Two of the ships are to be launched in April, one in May, one in June and two others in August and September. The steamer building for the Great Lakes Steamship Co. will be named for Horace S. Wilkinson, president of the company. She is a 600-footer and will be launched in May.

* * *

The steamer L. R. DAVIDSON is in dry dock at Buffalo with 35 damaged bottom plates.

* * *

Capt. Gilbert Johnston, 65 years of age, and for several years master on boats of the Richelieu & Ontario Navigation Co., and the Canada Steamship Lines, Ltd., died at Montreal, March 27. He was well known on the Great Lakes and along the St. Lawrence river.

* * *

The steamer EASTERN STATES, of the D. & C. line, reached Cleveland from Detroit, Monday, April 2. The run was made on schedule time. She left Detroit at 9:30 a. m., and docked at the East Ninth street pier at 4:30 p. m. The first boat to reach Cleveland last year arrived April 12, which makes this year's opening 10 days in advance of last season's.

* * *

Owners and managers of passenger and excursion steamers operated out of Detroit which touch points in Canada have begun to take notice of the new federal immigration law, effective May 1. This provides for a literacy test for all aliens entering the United States and for payment of a head tax of \$8. If this act were to be rigidly enforced, it

might have disastrous effects upon the excursion boats running between Detroit and Canadian ports.

* * *

S. B. Bowran has been appointed coal and ore dock agent for the Duluth, South Shore & Atlantic Railway Co., at Marquette, in place of J. S. Harland, deceased.

* * *

A number of changes in the aids to navigation in the twelfth district have been made by Lewis M. Stoddard, light-house inspector of the district. The principal ones are the changes in color of pier head structures, the idea being to make the structures and lights at all harbor entrances on Lake Michigan uniform. The shift will put red lights and red structures on the starboard hand and white lights and structures on the port hand when entering the harbor.

* * *

The steamer ROMAN, of the Pittsburgh Steamship Co., was the first bulk freighter to arrive at Cleveland this season.

* * *

The steel freighter WESTMOUNT, one of the largest ever built in Canada, was launched from the yards of the Collingwood Ship Building Co., Collingwood, Ont., on April 5. She is of the single-deck type, 550 feet long, 58 feet wide and 31 feet deep, with a capacity of 11,000 tons. She is being built for the Montreal Transportation Co. to trade between the head of the lakes and the grain ports above the Welland canal. Her machinery, which was also built in the Collingwood ship yards, comprises Scotch marine type boilers, 13 x 11 feet, carrying a working pressure of 185 pounds per square inch. The engines are triple expansion reciprocating type, capable of developing 2,400 horsepower, giving a speed of 13 miles per hour when loaded.

On the Chesapeake

By Hollis Bennett

For the first time in a number of years a direct consignment of coffee from Brazil has been received in Baltimore. Fifteen or 20 years ago there were a large number of barks and barkentines in this trade. The Norwegian steamship LOVLAND brought 4,000 bags from Rio de Janeiro consigned to the Wilber F. Spice Co.

* * *

On March 13 the Spedden Ship Building Co. launched the large tug boat FREEPORT SULPHUR Co. No. 2. The new vessel is 160 feet long, 26 feet beam and 14 feet molded depth. The boat is owned by the Freeport Sulphur Co.,

New York City. She is propelled by one single-inverted, triple-expansion engine, with cylinders 21 x 32 x 54 inches in diameter, with a 26-inch stroke. Steam is supplied by two Scotch single-end, three-furnace boilers fitted to burn fuel oil. The boilers are 12 feet in diameter and 11 feet long. The tug is fitted with electric lights, wireless, steam towing machine and steam steering gear.

The Baltimore & Stoney Creek Steamboat Co. has purchased from the Bush line, Wilmington, Del., the passenger and freight propeller HUNTINGTON. The steamer has been brought to Baltimore for overhauling and will be renamed STONEY CREEK.

Geo. L. Taylor, formerly superintendent with the Bethlehem Steel Co., at Sparrows Point, Md., has been appointed United States local boiler inspector at Norfolk, Va.

The Broadway Ferries Co., Baltimore, has purchased the Philadelphia passenger propeller steamer ENDEAVOR and will use her in general ferrying around the harbor.

Boston Bay News

By George S. Hudson

The Winnisimmet ferry, oldest in this country, has ceased to exist and the steamers CITY OF BOSTON and CITY OF MALDEN have been dismantled and will be used as harbor lighters in Boston and vicinity.

A cargo of bauxite, first of the kind ever shipped from Demerarra, B. W. I., to Boston, will be followed by further consignments as the supply from Europe is inadequate to meet needs of chemical factories.

Capt. H. B. West, in charge of the Boston district of the coast guard service, has been transferred to New York and Capt. F. M. Dunwoody, of the New York district, comes to Boston.

While steamship VIGO was being hauled out at the Atlantic Works, East Boston, a chain parted and a broken link caught the railway, dragging it into the harbor, the ship being captured half way across the stream. VIGO was formerly the French cable ship of that name, but is now under American registry.

Preparations are being made by the Eastern Steamship Lines to resume all-water passenger service between Boston and New York with BUNKER HILL and MASSACHUSETTS, using the Cape Cod canal to shorten the distance round the cape about 70 miles.

A 600,000-gallon cargo of New England rum is on the way to the west coast of Africa in the four-mast schooner ESTELLE KRIEGER, Captain Reemie. Mahogany will be the return cargo.

Coal rates paid to Boston ship owners on cargoes between this country and South America are the highest ever known. Rates between Chesapeake bay ports and New England are at the high

level of \$3 per ton and vessels are scarce.

Barkentine HERDIS, built by the R. T. Green Co., Boston, for the Herdis Sailing Ship Co., will load a cargo at New York for Norway. Another vessel of similar type has been contracted for.

Former Grenfell mission auxiliary schooner G. B. CLUETT has been renamed REYKJAVIK by Danish owners, and has sailed for Iceland. Another schooner for Dr. Grenfell will be built to take place of CLUETT as a supply ship for the coast of Labrador.

A 7,500-ton steamship for the Shawmut Steamship Co., Boston, will soon be launched at Chester, Pa. Four other

ships for the same owners will be delivered in about a year.

Three steam trawlers, SPRAY, FOAM and RIPPLE, have been sold by the Bay State Fishing Co. to foreign account and are being fitted with accommodations for 50 men each.

British schooner WANOLA, ashore near Boston and sold as junk for \$420, has been resold for \$8,000 and will be repaired.

Former America's cup sloop JUBILEE is now employed as a fisherman in Florida waters under schooner rig. Cup sloop DEFIANCE, only three years old, is being operated as a motor cargo-carrier out of Beaufort, N. C.

Along Puget Sound

By F. K. Haskell

THE Seattle Construction & Dry Dock Co. has launched the Norwegian freighter GOLDEN GATE, the first of three 7,500-ton steel ships which will be launched by June. The Skinner & Eddy Corporation also will launch three steel steamships during the next three months from its plant in Seattle. In deadweight carrying capacity, the six vessels will aggregate 50,300 tons. The steel freighter GOLDEN GATE is the first of seven steamships ordered by Norwegian and Danish interests to be launched.

The steel oil tanker S. V. HARKNESS has been launched from the Skinner & Eddy plant. She is owned by the Standard Oil Co. The firm soon will launch JOSHUA MACEY, a sister ship of HARKNESS.

As a war measure adopted by the Japanese government, the Nippon Yusen Kaisha has dismissed all but two of its American and European officers. The officers dismissed include Capt. N. Nielsen, Norwegian; Capt. A. Mockler, German; Capt. F. L. Sommers, Dane; Capt. C. H. Butler, Capt. J. P. Clark, Capt. A. E. Moses and Capt. John Walker, British; chief engineers J. Stark and W. Kerr, Americans. They were allowed full pay for six months and half pay for another six months. The two commanders who will remain in the service of the company are Capt. F. E. Cope, of the liner KITANO MARU, and Capt. H. Fraser, of HIRANO MARU, special permission having been granted by the Japanese government. The Nippon Yusen Kaisha employed more than 40 foreign officers a few years ago, but they have been gradually replaced by Japanese.

Under a charter closed recently, Frank Waterhouse & Co. took possession of the new Norwegian steamship, LUISE NIELSEN, which loaded a cargo for Japanese and Chinese ports. She sailed on her maiden voyage March 26.

After winning fame as a scout cruiser in the service of the Canadian naval forces off Cape Flattery, the British twin-screw power boat TANNIS has been purchased by the Winslow Marine Railroad & Ship Building Co., Seattle, and will be used as a tender. TANNIS

was formerly the American yacht W. C. STETSON. She was built in Muskegon, Mich., in 1908, and shipped to Tacoma.

The Overseas Shipping Co. has opened a branch in Seattle in the L. C. Smith building. C. A. Lockhart, who has been connected with the Canadian Pacific for a number of years, has been appointed manager of the new branch.

The freighter HILONIAN, for the second time in two months, has changed hands. The vessel, which was operated for years by the Matson Navigation Co. between Seattle and San Francisco, was sold to the Pacific Freighters Co. recently and has now been sold to eastern parties at private terms.

In New York Harbor

The number of passengers carried between Cristobal and New York by the Panama Railroad Steamship Line in the calendar year 1916 was 9,855, of whom 4,856 went from New York and 4,999 from Cristobal. During the fiscal year ending June 30, 1916, the number of passengers carried from Cristobal to New York on the line was 5,833, and the number from New York to Cristobal was 5,511. The total for the period was 11,344.

The steel steam trawlers, SPRAY, FOAM and RIPPLE have been sold by the Bay State Fishing Co. to A. Elder and associates, of New York, for \$100,000 each. SPRAY, 129 feet long, with a gross tonnage of 283, was built at Quincy, Mass., in 1905; FOAM and RIPPLE, 244 tons gross each, were built at the same place in 1910.

The plant of the Quintard Iron Works, 742 East Twelfth street, New York, has been taken over by the Todd Ship Yards Corporation, 15 Whitehall street, New York. The Todd corporation, in addition to the above, includes the Robins Dry Dock & Repair Co., Brooklyn, N. Y.; Tietjen & Lang Dry Dock Co., Hoboken, N. J.; Seattle Construction & Dry Dock Co., Seattle, Wash.; and the Tebo Yacht Basin Co., Brooklyn.

Equipment Used Afloat and Ashore

Signal and Revolution Indicator and Recorder

AN APPARATUS designed to receive and record the signals which indicate the direction and speed at which an engine of a boat is to be driven, or to receive and record the direction and speed at which the engine is driven, in accordance with such instructions, has been developed by William A. Griswold, Cleveland. The apparatus has been used on the lake freighter *MICHIGAN* on two trips.

The accompanying illustrations show the apparatus properly installed, with the chart in place; the mechanism; a side elevation, and the chart on which the records are inscribed.

The rotatable shaft or spindle, *A*, has a pulley, *B*, rigidly mounted upon its lower end and is geared to the crank or operating shaft of the engine. The governor is mounted upon the shaft. A shifting arm, *C*, is provided with an apertured head which fits upon the reduced extension of a cone clutch. The clutch is rotatively mounted upon the shaft. When the shaft is started in either direction, the governor then being practically inactive, the clutch elements are in contact and serve to swing or shift the arm, *C*, laterally in either direction. A shifting gear, *D*, engages with rack bars and with the gear teeth of bell crank levers. The gear is rigidly mounted upon a horizontal transverse shaft. A grooved pulley is mounted on this shaft and is connected

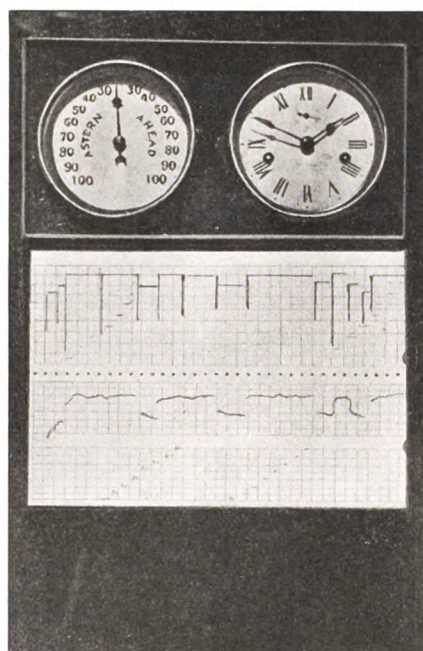


FIG. 1—APPARATUS INSTALLED IN ENGINE ROOM

by a belt, *E*, to the pulley, *F*. A second pulley is mounted upon the same shaft as pulley *F*, and is connected by a cross belt to a pulley which operates the hand on the combined speed and direction indicator, *G*. This indicator is arranged in the position shown. The scale indicates the number of revolutions per minute at which the engine is operating.

The recording mechanism, shown at the right, embodies an escapement roll having an annular set of teeth. This roll is rigidly mounted upon a vertical shaft. The chart-carrying roll is pivotally mounted within horizontal bars. A take-up roll is mounted in the same manner at the opposite end of the bars. The rotation of the escapement roll is controlled by the clock. The marking devices are shown at *H*. The lower marking device is shifted longitudinally by a rack bar, its operation being automatic. The upper marking device is moved downward by a compressible coil spring and upward by a cable. This cable is connected with another cable which connects with the chadburn in the captain's office, the cable extending to the engineer's room and operating an indicating hand which gives the orders to the engineer.

When the captain gives an order to the engineer, the cable manipulates the upper marking device, *H*, to the proper point on the chart. As the sheet is continuously traveling, a record is made of such orders, showing the time at which they were given. If the order received by the engineer is "ahead full speed", he starts the engine rotating forwardly. This rotates the shaft, *A*, clockwise, turning the cone clutch and swinging the shifting arm, *C*, to the right. This movement of the shifting arm swings the horizontal arm, *I*, of

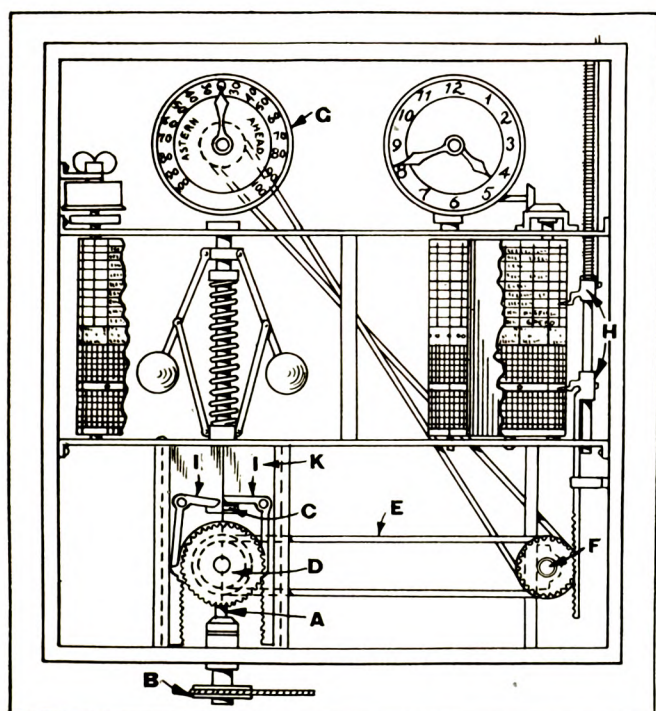


FIG. 2—SIDE ELEVATION OF RECORDING APPARATUS

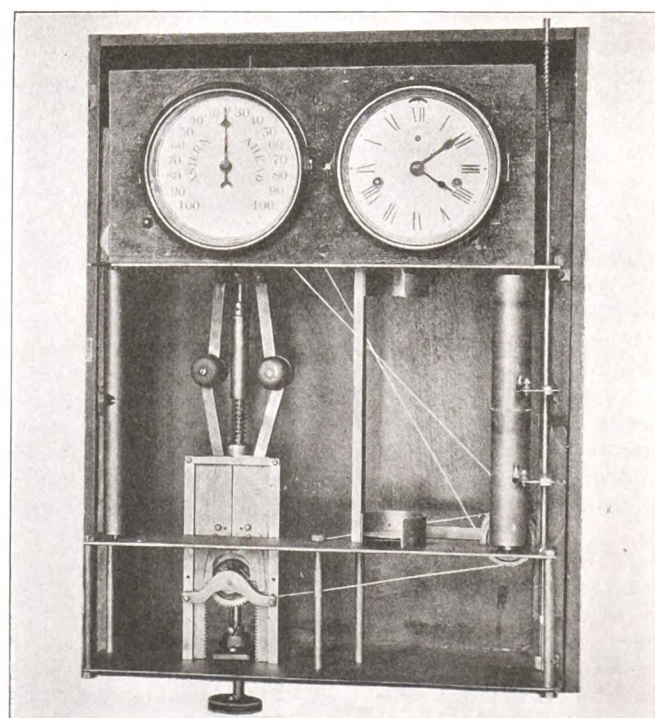


FIG. 3—VIEW OF INTERIOR OF RECORDING DEVICE

the bell crank lever upwardly and the lower arm inwardly, bringing the teeth of the rack bar into contact with the teeth of the pinion, *D*. As the speed of the rotation of the shaft, *A*, increases, the governor raises the carriage, *K*, bringing the teeth of the rack bar into mesh with the teeth of the pinion, *D*. This pinion rotates counterclockwise during the upward movement of the carriage, which, of course, continues in accordance with the operation of the governor. The turning of the pinion, *D*, is transmitted to a pulley by the belt, *E*, and through another pulley to the hand on the indicator.

The chart, Fig. 4, is divided by horizontal lines into two sections, one to indicate the captain's orders and one the engine records. Provision is made, as shown, for full speed, half speed, slow, etc., both ahead and astern. The vertical lines divide the chart into 10-minute sections. Each chart is of sufficient length to record all engine movements during an 8-day journey.

This apparatus was designed by Mr. Griswold to show and record all orders given by the captain to the engineer, together with the actual time at which they were given. Through the recording of such orders, the device thus shows the changes in the course. The record serves as a protection, both to the captain and the engineer, in the event that the necessity develops for ascertaining what orders were given. The operation of the engine for 6-hour periods appears before the glass window at all times.

New Expansion Joint

The Doust patent expansion joint, made in England, is entirely telescopic in its action and has neither gland, packing nor rings. It has been standardized by the board of trade for steam working pressure up to 215 pounds per square inch, and is approved by Lloyds. It has two outer shells and two inner liners with flanges on the ends; bolts pass through the flanges of the pipes. With an alteration of length of range of pipes due to expansion or contraction they are free to work telescopically. In addition to the original Doust joint which has four sleeves, a new joint has been developed with three sleeves and is now under test to establish its suitability for steam.

H. H. Kellerman, for many years in the New York service of the Cunard Line as head of one of its passenger departments, has been assigned to take charge of the office of the Cunard and Anchor lines in Pittsburgh. The office, which it is anticipated will be ready for occu-

pancy about May 1, will be situated in the Chamber of Commerce building in Pittsburgh, now nearing completion. Charles G. Andrews, at present manager of the firm of J. J. McCormack & Co., tourist and travel agents, of Pittsburgh, will be Mr. Kellerman's assistant.

Marine Paints

The ravaging agents of the sea seem to have little regard for the material of which the ship's bottom is constructed. The injurious effects of barnacles, or of parasites give importance to the protection of both steel and wooden hulls. Ship operators will, therefore, be interested in a line of protecting com-

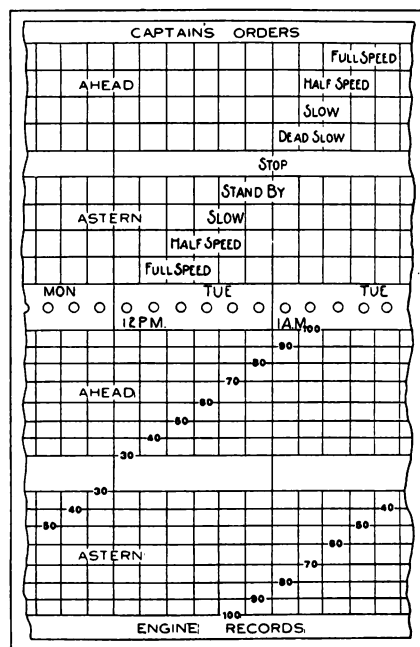


FIG. 4—SECTION OF RECORDING CHART

positions which have been developed by the Holzapfel's American Compositions Co., New York. Among the various compositions described in the several publications issued by the company is one which is said to be a reliable substitute for copper and yellow metal for coating wooden bottoms. The paint is applied to a cleaned surface with brushes; it dries in a short time and leaves a smooth surface, which is said to afford an effective protection against boring worms and the adhesion of grass, etc. The company also manufactures an assortment of marine paints which are already mixed when supplied to the user. The application of these paints to a ship's hull is said to protect it from deterioration and to reduce the water friction.

The dreadnaught *NEW MEXICO*, building at the New York navy yard, is scheduled to be launched on April 23. She mounts 12 14-inch guns.

Makes Stills of Many Sizes

The Standard Water Systems Co., Hampton, N. J., manufactures a complete line of stills ranging in capacity from 125 to 2,500 gallons per day of 24 hours. The 750-gallon still, which was described in the March issue of *The Marine Review*, was especially designed to meet the special requirements of service in lake vessels. The stills of larger and smaller capacity, however, are adapted for a wide variety of uses.

New Type of Air Tools

Advancement in the design and in the construction of pneumatic tools has led to the adoption of pressed vanadium steel connecting rods and pistons in the drills manufactured by the Independent Pneumatic Tool Co., Chicago. The company points out that the use of this alloy for these parts will permit higher operating speeds and will insure better wearing qualities. The many different types of air drills manufactured by the Independent company are described in a recent catalog, which is illustrated with views of the assembled tools and the component parts. The pneumatic tools are used for innumerable purposes, among which may be mentioned drilling, reaming, tapping, wood-boring, grinding, riveting, etc.

Among other new features of these tools is the adoption of roller bearings, which were applied first to the drill designed for use in close quarters. The successful operation of this type of tool vindicated their general adoption. A telescopic feed screw has been developed that has the advantage of being compact. It has a large range of adjustment which is obtained by threading the inner sleeve both inside and out. In addition to air drills, the company manufactures a number of types of pneumatic hammers, which are used for chipping, calking, riveting and similar purposes. The catalog also describes the line of electric drills recently developed by the company's engineers. A few pages which are devoted to the care of air tools will be found valuable.

Drop Hammers

A 64-page bulletin describing and illustrating automatic drop hammers is being distributed by the Standard Machinery Co., Auburn, R. I. These machines are made in 10 different sizes with hammers ranging in weight from 50 to 1,200 pounds. The anvil is made extra heavy in proportion to the weight of the hammer. The poppets are forged steel. They are held in place by dowel screws. Poppet screws are crucible steel. The uprights are fastened to the anvil by heavy bolts with check nuts.